Information Circular 87-1

NEW BRUNSWICK'S MINERAL INDUSTRY
1986

Edited by
Barbara M.W. Carroll

Minerals and Energy Division
Department of Natural Resources and Energy
Province of New Brunswick
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PREFACE

This is the tenth in a series of reports on the mineral industry of New Brunswick. The information contained within this report, which is not contained in our normal series of reports, will serve as a historical record of exploration, development, mining, and government activities, as well as related matters that have taken place within the Province during 1986.

The staff members of the Minerals and Energy Division who have contributed sections to this report are:

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Karen Gallagher typed the report and Terri Leonard drafted maps and graphs.

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CHAPTER 1. GOVERNMENT ORGANIZATION AND PROGRAMMES

MINERALS AND ENERGY DIVISION[1]

Assistant Deputy Minister: William F. Denny
Address: P.O. Box 6000, Fredericton, N.B. E3B 5H1
Telephone: 453-3862

New Brunswick, like other provinces in Canada, has traditional responsibilities with respect to the mineral resources it owns and controls. It administers, through a number of Acts, all matters related to the exploration, development, production, smelting, refining, transportation and taxation of its basic metallic, nonmetallic and structural material resources. The Minister of Natural Resources and Energy has sole responsibility for these Acts, which are administered by the Minerals and Energy Division.

Dr. R. Richard Potter, Assistant Deputy Minister, left the Department in 1986 to work in Nova Scotia; William F. Denny replaced Dr. Potter as the Assistant Deputy Minister responsible for Minerals and Energy Division.

During the year the name of the Department was changed to 'Natural Resources and Energy,' and the previously separate 'Energy Secretariat' was incorporated into the department as the 'Energy Branch' of the 'Minerals and Energy Division.'

Figure 1a indicates the position of the Minerals and Energy Division within the department; Figures 1b, 1c and 1d show the detailed organization of the three branches.

GEOLOGICAL SURVEYS BRANCH[2]

Director: Dr. J. Leslie Davies
Address: P.O. Box 6000, Fredericton, N.B. E3B 5H1
Telephone: 453-2206

The Geological Surveys Branch is responsible for the collection and dissemination of information pertaining to the geology and mineral deposits of New Brunswick. Closely associated activities include the encouragement of mineral exploration, the promotion of the mining industry, and assistance to those who formulate resource and land use policies. Although the activities of the Branch since its formation have been aimed at helping the mineral industry, there is an increasing awareness and use of geological knowledge in land use planning, environmental evaluations, engineering projects, and groundwater studies. The principal objective of the Branch is to provide a complete and up-to-date inventory of geological data to stimulate and guide mineral exploration, and to encourage sound resource planning.

Numerous field projects were carried out in 1986, mainly in the areas of higher mineral potential in northern and southern New Brunswick. Projects included mineral deposit studies, regolith mapping, drill core collection and storage, geoscience data management, prospecting courses, preparation of public displays and continuation of stream silt geochemical surveys (Figure 2).

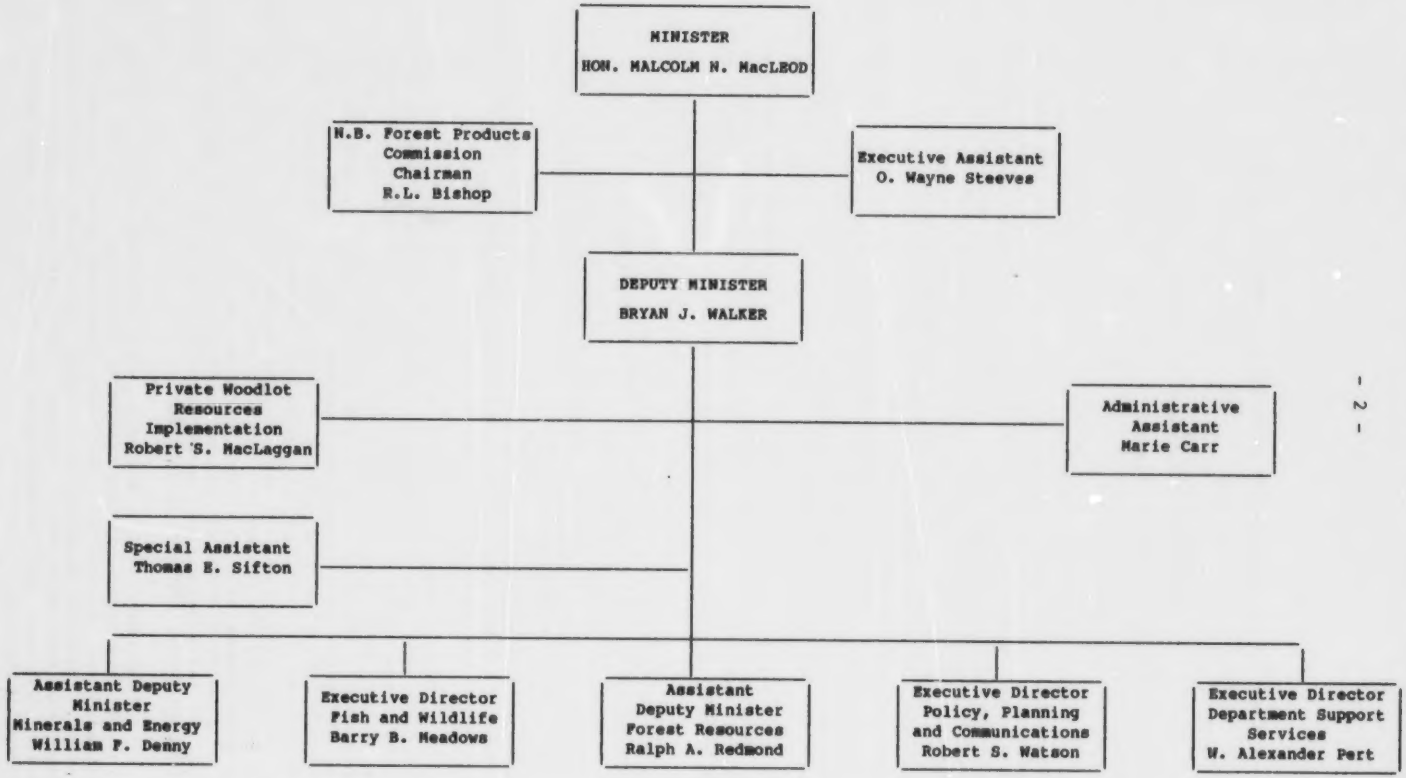
MINISTER
HON. MALCOLM N. MacLEOD
N.B. Forest Products Commission Chairman R.L. Bishop
Executive Assistant O. Wayne Steeves
DEPUTY MINISTER
BRYAN J. WALKER
Private Woodlot Resources Implementation Robert S. MacLaggan
Administrative Assistant Marie Carr
Special Assistant Thomas E. Sifton
Assistant Deputy Minister Minerals and Energy William F. Denny
Executive Director Fish and Wildlife Barry B. Meadows
Assistant Deputy Minister Forest Resources Ralph A. Redmond
Executive Director Policy, Planning and Communications Robert S. Watson
Executive Director Department Support Services W. Alexander Pert

Figure 1a. Plan of Organization, New Brunswick Department of Natural Resources and Energy.

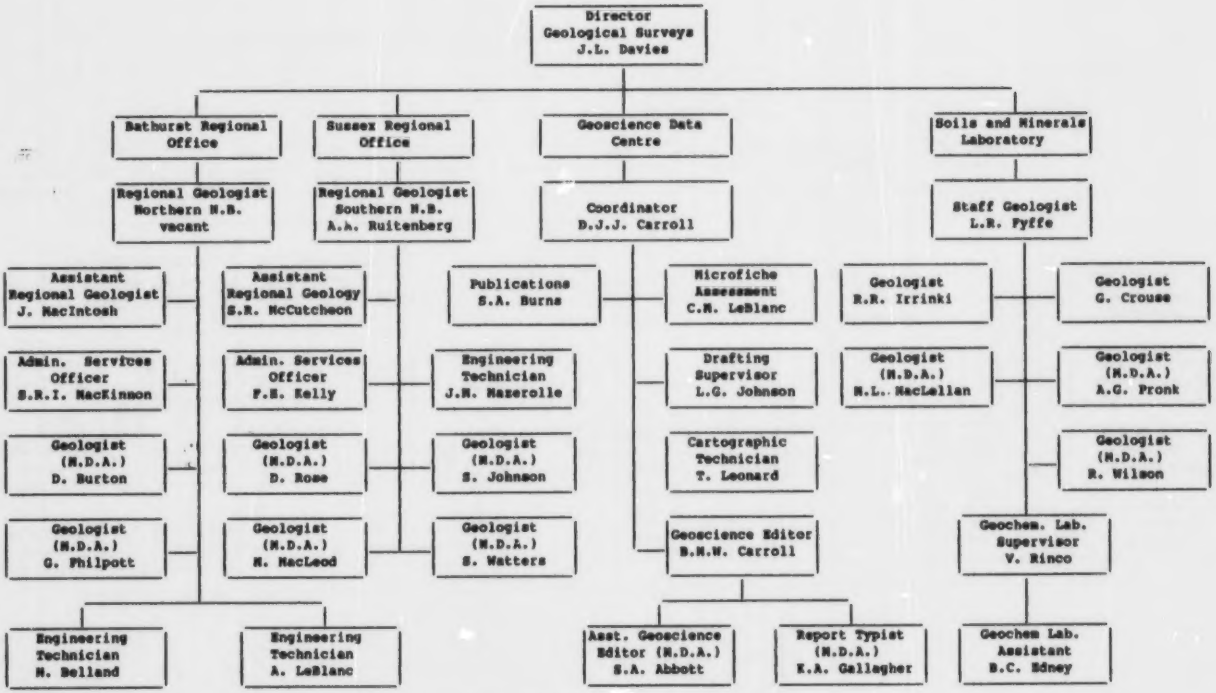

Figure 1b. Plan of Organization, Geological Surveys Branch.

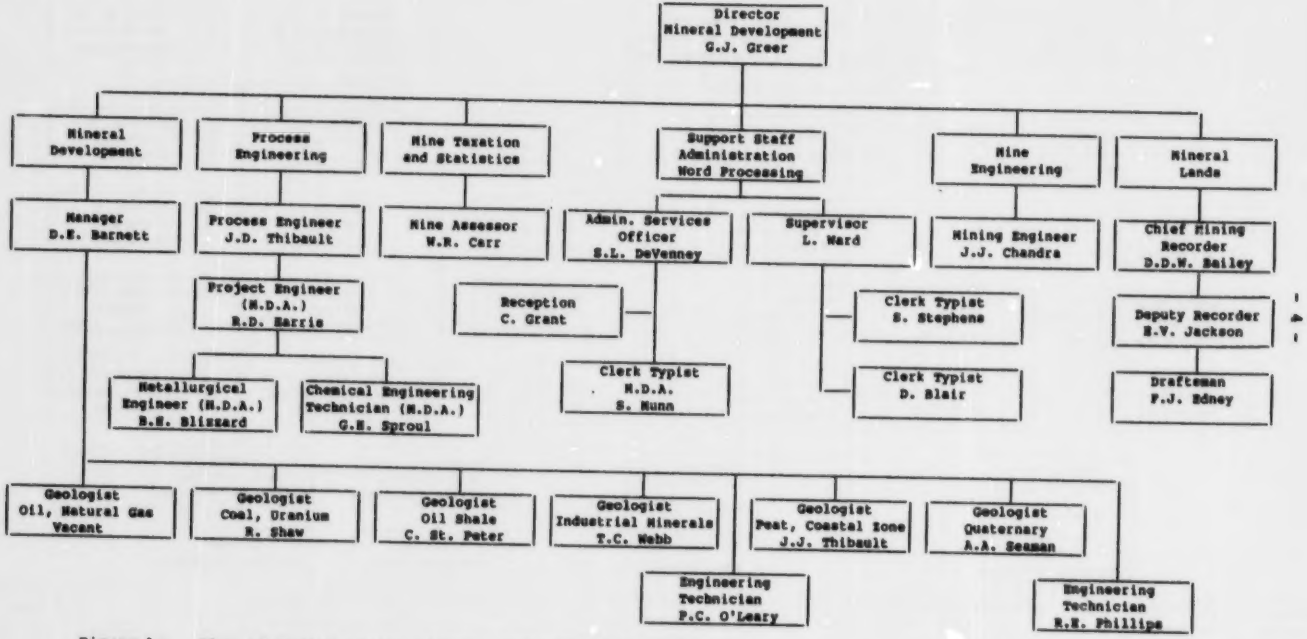

Figure 1c. Plan of Organization, Mineral Development Branch.

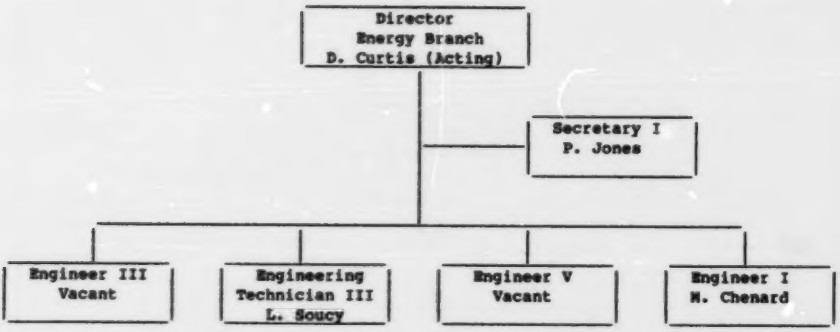

Figure 1d. Plan of Organization, Energy Branch.

Many of the Branch's activities in 1986 were carried out under the Canada-New Brunswick Mineral Development Agreement (MDA). This accord entails an expenditure of $22 300 000 over a five-year period on geoscience, mineral technology, and public awareness programmes.

In 1986, Dr. J. Leslie Davies accepted the position of Director for the Geological Surveys Branch, following the retirement of the former Director, John B. Hamilton in 1985.

Bathurst Regional Office[2]

Regional Geologist (acting): Dr. J. Leslie Davies
Address: P.O. Box 50, Bathurst, N.B. E2A 3Z1
Telephone: 546-6600

The staff of the Bathurst Regional Office in 1986 consisted of Dr. J. Leslie Davies (acting Regional Geologist), Jim A. MacIntosh (Assistant Regional Geologist), Sharon McKinnon (Administrative Services Officer), and André LeBlanc and Maurice Belland (Engineering Technicians). J.L. Davies assumed the position of Director of Geological Surveys Branch in 1986, dividing his time between the Bathurst and Fredericton offices. Donald M. Burton, and Gregory R. Philpott are contract geologists responsible for projects funded through the Canada-New Brunswick Mineral Development Agreement (MDA). Terry G. Mersereau assisted in the MDA-funded geoscience compilation project. Most of the field work and data collection activities conducted from the Bathurst Regional Office utilized MDA funds. Provincial budgets alone are not sufficient to sustain large projects.

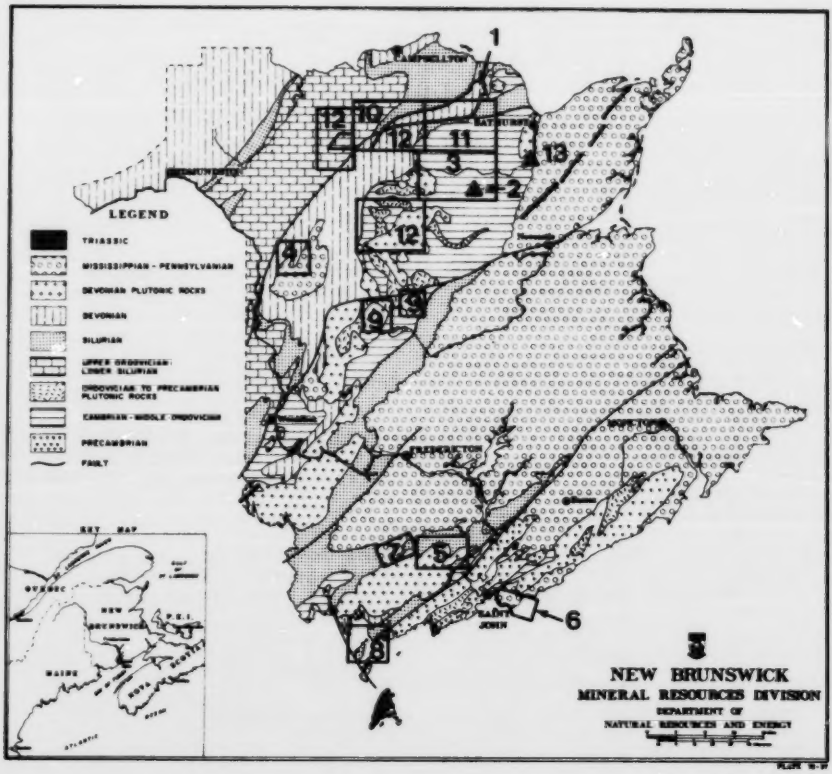

Figure 2. Areas in which Geological Surveys Branch projects were conducted in 1986: (1) gold potential along Jacquet River Fault; (2) Heath Steele structural study; (3) geoscience compilation (21 O/8); (4) mapping, New Denmark area; (5) mapping eastern Saint George Batholith; (6) mapping, gold-bearing rocks, Cape Spencer area; (7) Mount Pleasant Caldera project; (8) till mapping, Mascarene Peninsula; (9) mapping, Burnthill area; (10) surficial geology, Upsalquitch Forks (21 O/10); (11) surficial geology, Tetagouche Lakes (21 O/9); (12) geochemical studies; (13) Key Anacon study.

CANADA-NEW BRUNSWICK MDA PROJECTS Don Burton and Greg Philpott combined forces to assess the gold deposit potential of the Lower Devonian (and Upper Silurian?) volcanic rocks along the Jacquet River Fault. A contract was awarded to the Geology Department of the University of New Brunswick (UNB) to study the Heath Steele sulphide deposit. Jeff G. Torrance is the project coordinator. The geoscience compilation project, managed by Terry Mersereau, is underway. (Figure 3).

PROVINCIAL PROJECTS J.A. MacIntosh resumed geological mapping (scale: 1 inch equals 1/4 mile) in the O-9 map area and has now completed all the field checking (Figure 2). The map report covering the area is in preparation.

DIAMOND-DRILL CORE A large amount of core was accepted from the Flat Landing Brook sulphide deposit in 1986. The core is part of an intensive drilling programme carried out by Brunswick Mining and Smelting Corporation Limited.

OTHER ACTIVITIES André LeBlanc and Sharon McKinnon carried out work related to claim staking and related activities associated with extensive gold exploration. Mr. LeBlanc continued his work of transferring claim data to new 1:50 000 base maps and keeping mineral exploration assessment index maps up-to-date. Mr. LeBlanc also carried out claim inspections in the field.

M. Belland continued his compilation of exploration assessment data, and assisted the Regional Geologist in coordinating mineral exploration activities and forestry operations. Geological compilation was begun for the Tetagouche Lakes map area (21 O/9) and the Nepisiguit Falls map area (21 P/5).

Figure 3. Signing of the MDA geoscience compilation project contract by (l to r) Hon. Malcolm N. MacLeod, Minister of Natural Resources and Energy; Bryan J. Walker, Deputy Minister; Kenneth D.A. Whaley, consultant; and David G. Keys, consultant.

The Regional Geologist and his staff participated in career expositions in various high schools in the region. They have also conducted or assisted in field tours of the region for visiting geologists.

The Regional Geologist co-authored a paper with A.A. Ruitenberg dealing with gold deposits of New Brunswick. He also gave talks to a variety of organizations describing exploration for gold in New Brunswick.

Financial assistance was rendered to J.D. Greenough, a St. Mary's University student who is studying possible mantle-derived mafic rocks in New Brunswick.

J.A. MacIntosh and J.L. Davies assisted local authorities in the planning of the Petit Rocher Mining Interpretation Centre that was officially opened in June, 1986 (Figure 4).

Sussex Regional Office[3]

Regional Geologist: Dr. Arie A. Ruitenberg
Address: P.O. Box 1519, Sussex, N.B. E0E 1P0
Telephone: 433-4317

The Sussex Regional Office staff in 1986 consisted of Arie A. Ruitenberg, Regional Geologist; Stephen R. McCutcheon, Assistant Regional Geologist; Maurice R. Mazerolle, Engineering Technician; and Freda H. Kelly, Administrative Services Officer (Figure 5). Malcolm J. McLeod, Sheila E. Watters, David G. Rose, and Susan C. Johnson were employed on long-term contracts as part of the Mineral Development Agreement between the Government of Canada and the Province of New Brunswick.

PROGRAMMES AND PROJECTS M.J. McLeod nearly completed detailed (1:20 000 scale) maps of the eastern Saint George Batholith (Figure 2). Studies included geochemistry, petrography, and age dating of the various granitic phases and of the endocontact tin- and tungsten-bearing greisens. Exocontact mineral occurrences, particularly gold, are currently being assessed. A computerized compilation of all geochemical information available for the batholith and related satellite intrusions was started.

S.E. Watters continued field work on gold deposits and occurrences in the Bay of Fundy coastal zone (Figure 2). Detailed geological mapping was concentrated between Cape Spencer and West Beach. Recently drilled cores from the area were logged (Figure 6). Radiometric dating is being conducted on zircon in deformed granite and illite, which is an alteration product associated with the gold ores. A study comparing gold abundances in heavy concentrates and lighter fractions of typical crushed ores from Cape Spencer was completed.

S.R. McCutcheon continued work on the Mount Pleasant caldera (Figure 2). The report on this area is in its final stage. The most surprising discoveries during 1986 involve the age and chemical composition of the rocks in the caldera complex. Dating of plant spores found in sediments interbedded with the volcanic rocks established that the complex is Late Devonian (Famennian) rather than Carboniferous. This is

Figure 4. Opening ceremonies at the Petit Rocher Mining Interpretation Centre.

Figure 5. Freda Kelly carries out daily office duties at the Sussex Regional Office.

Figure 6. Sheila Watters, who is studying the gold-bearing rocks near Cape Spencer, examines core at the Sussex Regional Office.

consistent with the Late Devonian K-Ar mineral ages that have been recently reported (see Information Circular 86-2) from the Mount Douglas and Burnthill granites, respectively, in southern and central New Brunswick. It also means that the tin-tungsten deposit at Mount Pleasant is probably Late Devonian as well. Geochemical studies demonstrated that the acid volcanic rocks have a limited compositional range, with single eruptive units showing as much variation as the entire suite. This indicates that the parent magma chamber was very large and had a fairly uniform bulk composition. The trace-metal content of the bulk magma was very low, as reflected in the acid volcanic rocks erupted from it. The tin-tungsten deposit at Mount Pleasant was presumably derived from this bulk magma, which suggests that the mechanism of scavenging and concentrating metals at the roof of the magma chamber was very efficient. The Mount Pleasant deposit owes its existence to the fact that no further eruptions occurred after the metal-rich fluids separated from the magma and accumulated in the upper part of the chamber.

A.A. Ruitenberg continued a comparative study of gold deposits in the Province. In New Brunswick, the oldest gold concentrations occurred in bimodal volcanic sequences and equivalent distal sedimentary rocks ranging in age from Precambrian to Silurian. The gold first produced in the Province was derived from gossan caps overlying volcanogenic massive sulphide deposits in the Bathurst area. Later concentrations of gold occurred in a variety of epigenetic

deposits including quartz-carbonate veins, porphyry copper and contact metasomatic deposits, polymetallic veins, and locally fractured subvolcanic intrusions and greisen veins. The epigenetic deposits are mainly associated with dilatent fault zones along the boundaries of tectonostratigraphic terranes. The youngest deposits occur in dilatent structures in close proximity to unconformities between Precambrian volcanic and intrusive rocks and Carboniferous or older clastic sedimentary cover. A metallogenic map showing the gold deposits in New Brunswick was compiled by S.C. Johnson and A.A. Ruitenberg and was exhibited at the 55th Annual Meeting and Convention of the Prospectors and Developers Association in Toronto.

D.G. Rose and S.C. Johnson initiated a computerized mineral inventory for the Province. The objective of this project is to provide rapid access to geological, geophysical, and bibliographic information on all documented mineral occurrences in the Province. The file will be maintained on a microcomputer system with copies in Sussex, Fredericton, and Bathurst. Activities to the year's end included assembling and organizing of data sources, establishment of preliminary file design, installation of computer equipment and programmes, coding of 30 mineral occurrences, and revision of the first version of the file design.

Preliminary results of various aspects of the above-mentioned investigation were presented at the eleventh Annual Review of Activities of the Minerals and Energy Division in Fredericton and the 55th Annual Meeting and Convention of the Prospectors and Developers Association in Toronto.

In addition to various long-term programmes, short-term projects were continued. A metallogenic map of New Brunswick (scale: 1:1 000 000) was completed and submitted to the United States Geological Survey for inclusion in a metallogenic map of the United States and Canadian Appalachians.

Till mapping and geochemistry over mineralized zones was continued. The 1986 programme was conducted by P.G. Chiswell over the gold- and base-metal-sulphide-bearing rocks in the Mascarene Peninsula and Deer Island, south of St. George (Figure 2). The bedrock geology of this area was previously mapped by A.A. Ruitenberg in 1968 and H.V. Donohoe in 1978.

Field trips to gold deposits along the Bay of Fundy coast and to the Annidale copper-gold deposit were provided for senior geology students of the University of New Brunswick.

Consultations were provided for many geologists, prospectors, and engineers during the year. The main interest continued to be gold deposits. Assistance was also provided to the New Brunswick Department of Transportation in resolving problems associated with solution collapse of the Windsor rocks under Highway 860 in the Salt Springs area, southwest of Sussex.

Geological advice related to forest site classification was provided to foresters employed by the Department of Natural Resources and Energy, and the forest industry. Regolith maps for northern and southern New Brunswick, prepared by A.G. Pronk and P.G. Chiswell respectively, provide essential information with respect to nutrient potential, internal drainage, and general ground conditions.

Soils and Minerals Laboratory[4]

Staff Geologist: Leslie R. Fyffe
Address: P.O.Box 6000, Fredericton, N.B. E3B 5H1
Telephone: 453-2206

The Geoscientific Services staff at the Soils and Minerals Building in Fredericton consists of L.R. Fyffe (Staff Geologist), R.R. Irrinki (Metallic Minerals Geologist), G.W. Crouse (Core Librarian), V. Rinco (Geochemical Analyst), and B. Edney (Laboratory Assistant).

In addition to the regular staff activities, several projects were carried out by contract and summer personnel under the MDA. In central New Brunswick, H. Elizabeth MacLellan continued studies of the Burnthill granites; in northern New Brunswick, A.G. (Toon) Pronk mapped the surficial geology of the Upsalquitch Forks area and Reginald A. Wilson mapped in the New Denmark area. (Figure 2)

GEOLOGY The objective of the Burnthill project within central New Brunswick (21 J/10) is to determine the petrochemical evolution of the Late Devonian granites and associated tin-tungsten mineralization in order to develop criteria that will aid in the exploration for similar types of deposits. The project began in June of 1985 with the field mapping of the Burnthill Granite. In 1986, the field work was completed on the Dungarvon and Sisters Brook granites. A map of the Burnthill Granite has been published and the others are at the drafting stage. The results of radiometric dating on the Burnthill Granite have been submitted for publication in Economic Geology. A paper on the project was presented at the 55th Annual Meeting and Convention of the Prospectors and Developers Association in Toronto. Future publications will describe in detail the geology and petrochemistry of the granites.

The surficial geology of the Upsalquitch Forks area (NTS 21 O/10) was mapped during the 1986 field season in order to obtain information on tills in the vicinity of the Rocky Brook-Millstream Fault. This fault zone is known to be related to gold mineralization in the Elmtree area northwest of Bathurst. There, the fault separates conglomerates of the Silurian Chaleurs Group to the south from Ordovician slates of the Elmtree Group to the north. A sheared and altered gabbroic dyke within the fault zone contains 3.43-10.63 g/t (0.10-0.31 oz./ton) gold across widths of 0.3-2.0 m. Gold occurrences have recently been discovered in the Upsalquitch Forks area and are apparently related to splays off the Rocky Brook-Millstream Fault system. These occurrences are found within silicified dykes of intermediate composition and within silicified and pyritized zones within adjacent calcareous siltstones of the Chaleurs Group. Values of up to 7.89 g/t (0.23 oz./ton) gold over 1.0 m have been reported.

Previous surficial mapping and till geochemistry in 1985 within the Tetagouche Lakes area (NTS 21 O/9) confirmed the relation between the Rocky Brook-Millstream Fault zone and the presence of gold in northern New Brunswick. Gold anomalies in tills were found along the fault boundary between sedimentary rocks of the Chaleurs Group in the south and Devonian mafic volcanic rocks of the Dalhousie Group to the north. Not all anomalies were associated with this fault zone,

however. Some were located along the contact between Silurian felsic and mafic volcanic rocks to the north of the Rocky Brook-Millstream Fault and within Ordovician felsic metavolcanic rocks of the Tetagouche Group to the south of Forty Mile Brook. A total of 48 out of 266 samples in the Tetagouche Lakes area were highly anomalous in base metals and gold-pathfinders. Although only 12 of these samples indicated the presence of gold, the other anomalous sites should be considered for further investigation. Anomalous values from pan-concentrated samples ranged from 6 to 619 ppb Au.

Bedrock geological mapping in the New Denmark area, Victoria County, N.B., was undertaken by Reg Wilson in the summer of 1986 in an effort to improve existing geological maps and to stimulate mineral exploration in northwestern New Brunswick. Field work was carried out within portions of four NTS sheets: 21 J/13, J/14, O/3 and O/4. The area is underlain by Lower Paleozoic clastic sedimentary rocks and volcanic rocks of the Aroostook-Matapedia and Tobique tectonostratigraphic zones.

Samples of felsic and mafic volcanic rocks from the New Denmark area have been analyzed for major- and trace-element contents by X-ray Fluorescence Spectroscopy at St. Mary's University, Halifax, Nova Scotia. Interpretation of this data has aided in the characterization of the chemical affinity and tectonic setting of volcanic activity. A comprehensive report incorporating the results of all investigations will subsequently be prepared.

DRILL CORE MANAGEMENT[5] A new building capable of housing 60 960 m of drill core has been constructed on the site of the Sussex Regional Office. An inventory has been made of the core stored at the three regional offices. The Province has nearly 121 920 m of core in the Bathurst (Madran) repositories, 60 960 m at Sussex, and 38 100 m in Fredericton. About 31 394 m of core was donated to the Province by mining companies this year. Files are being prepared summarizing the drill-hole data, and this information is being computerized.

GEOCHEMISTRY Analyses were performed on 819 till samples from the Tetagouche Lakes area (NTS 21 O/9). Eight elements (Cu, Pb, Zn, Mn, Fe, Co, Ni, Ag) were analyzed by atomic absorption and two (Sb, Mo), by colorimetry.

A total of 933 silt samples, collected in 1981, were analyzed in 1986 for Au, As, Sb, and Ba. These were taken from Upsalquitch Forks (NTS 21 O/10), Tetagouche Lakes (NTS 21 O/9), Kedgwick (NTS 21 O/11), Serpentine Lake (NTS 21 O/2), and Sisson (NTS 21 O/6) map areas, and contained the necessary 15 g.

Approximately 27 000 silt samples kept at the Soils and Minerals Building were previously stored according to the year collected. These have now been filed by NTS map area to better reflect their geographic distribution. In 1986 several hundred of these samples from 21 O/3, 21 O/6, 21 O/7, 21 O/10, 21 O/11, and 21 O/16 were reanalyzed for gold, barium, antimony and arsenic. Remaining samples will also be analyzed for gold.

P. Arsenault was contracted during 1986 to computerize all stream silt geochemical data gathered by the Geological Surveys Branch.

SULPHIDE DEPOSITS STUDY[6] The Key Anacon sulphide deposit is the second to be evaluated as part of a provincially funded study being carried out on important base-metal deposits in northern New Brunswick (Figure 2). The deposit consists of at least four mineralized zones occurring as northwest-trending en echelon lenses within a 3 km long sulphide-bearing sequence. These zones from southeast to northwest are: Zone 1, Zone 2, Zone 3, and Copper Zone. Zone 2 is the only zone that has been sufficiently investigated by underground drilling. A report on the Key Anacon deposit is in the final stages of completion. The following work on the deposit has been completed.

1. Map showing the four sulphide zones and surface projection for diamond-drill holes.

2. Surface projection of drill holes, cross sections and longitudinal sections for Zone 1.

3. Nine level plans, 19 cross sections and four longitudinal sections for Zone 2.

4. Surface projection of drill holes, cross sections and longitudinal sections for Zone 3.

5. Surface projection of drill holes, cross sections and longitudinal sections for Copper Zone.

6. Estimation of reserves for all four zones.

7. Relogging of about 200 underground diamond-drill holes and systematic collection of 500 samples from Zone 2.

8. Studies on 75 regular thin sections and 35 polished thin sections and probe work on 10 polished thin sections.

Besides the work done on the Key Anacon deposit, the work on the Chester deposit has been incorporated in Map Report 86-2 (Geology of Big Bald Mountain map area (21 O/1), New Brunswick).

Geoscience Data Centre[7]

Coordinator: Donald J.J. Carroll
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Telephone: 453-2206

The Geoscience Data Centre consists of the following staff members: Donald J.J. Carroll (Coordinator), L. Gerard Johnson (Cartographic Technician), Terri Leonard (Cartographic Technician), Susan A. Burns (Publications Officer), Carol M. LeBlanc (Microfiche/Assessment Files Officer), Barbara M.W. Carroll (Geoscience Editor), Shasta A. Abbott (Assistant Geoscience Editor - MDA), Karen A. Gallagher (Report Typist - MDA).

In early 1986, the Geoscience Editor's Section became part of the Geoscience Data Centre. The addition of this section brought together all people concerned with the cartographic production of maps and drawings, the technical editing of geoscientific documents, and the dissemination of these publications to the general public and mineral industry.

Some of the activities carried out during the calendar year 1986 are summarized below.

GEOSCIENCE EDITORIAL SERVICES The responsibility of the Geoscience Editor's Section is to edit all geoscientific reports and maps that are produced by or for the Minerals and Energy Division. Because of the increased workload from projects conducted under the Canada-New Brunswick Mineral Development Agreement (MDA), an assistant geoscience editor and a report typist have been hired for the term of the Agreement. In 1986, the staff of this section edited and/or prepared for publication 18 reports and approximately 300 maps.

PUBLICATIONS The Publication Section of the Geoscience Data Centre plays an important role in the dissemination of geoscientific data produced by or for the Minerals and Energy Division as well as data on New Brunswick that has been produced by or for the Geological Survey of Canada.

In 1986, the Geoscience Data Centre released more than 511 publications consisting of plates (mainly maps) and reports, involving eight public releases of geochemical and/or airborne geophysical survey results conducted by the Geological Survey of Canada under the MDA or the New Brunswick Department of Natural Resources and Energy. These included:

1. **April 29, 1986** Airborne gamma ray spectrometric, VLF and magnetic survey, Miramichi Highlands. Geological Survey of Canada. (21 O/1,2,7,8; 21 J/10E,15,16)

2. **May 28, 1986** Airborne gamma ray spectrometric, VLF and magnetic survey, St. George-Saint John region. Geological Survey of Canada. (21 G/1W,2,7,8W)

3. **May 28, 1986** Surficial geology and till geochemistry of Goose Creek. New Brunswick Department of Forests, Mines and Energy, Mineral Resources Division. (21 H/6,11)

4. **June 17, 1986** Stream sediment geochemical survey, northern New Brunswick. New Brunswick Department of Forests, Mines and Energy, Mineral Resources Division. (21 N/2e,f,g; 21 N/6a; 21 N/7a,b,c,d,g,h; 21 N/8a,b, c,d,e,f,g,h)

5. **July 2, 1986** Regional stream sediment and water geochemical reconnaissance data, northern New Brunswick. New Brunswick Department of Forests, Mines and Energy, Mineral Resources Division. (21 O/9,10,11,13,14,15,16; 22 B/1,2)

6. **July 8, 1986** Re-analyzation of stream sediment samples New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division. (21 O/2,6,8, 10,11)

7. **Sept. 23, 1986** Till geochemistry of Tetagouche Lakes map area. New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division. (21 O/9)

8. **Dec. 19, 1986** High resolution aeromagnetic total field and vertical gradiometer survey, Bathurst area. Geological Survey of Canada. (21 O/8,9,15,16; 21 P/5, 12,13; 22 B/1)

Geoscience publications distribution and sales from the Fredericton office in the 1986 calendar year totalled more than 6400 maps and reports. More than 70% of these sales were to individuals working for the mineral exploration industry.

GEOSCAN The Geological Survey of Canada's computer-based bibliographic geoscience data file, called GEOSCAN, was again updated with the addition in 1986 of more than 100 coded assessment reports and scientific publications.

As in previous years, custom GEOSCAN indexes were specially produced for the 55th Annual Meeting and Convention of the Prospectors and Developers Association in Toronto, and the Minerals and Energy Division's eleventh annual Review of Activities, held in November. This index to assessment report data covered the year 1985-86.

MINERAL EXPLORATION ASSESSMENT FILES A total of 102 assessment reports were received by the Mining Recorder's office in the 1986 calendar year. All reports have been microfilmed and duplicate microfiche have been distributed to the six regional libraries in New Brunswick and the two regional Geological Surveys Branch offices in Bathurst and Sussex.

Anyone wishing to purchase either a complete set of the New Brunswick assessment data on microfiche or selected files may do so by contacting Precision Microfilming Services, 6100 Young Street, Halifax, N.S. B3K 2A4.

AUDIOVISUAL PRODUCTS The Geoscience Information Services section maintains a library of audiovisual products related to the geology and mineral resource industry of the Province. Products, such as the 16 mm movie entitled 'The Awakening Giant," the 35 mm slide programmes entitled 'The Mineral Industries of New Brunswick' and 'The Peat Industry of New Brunswick," are available on a loan basis. These audio-visual materials are frequently used by staff for various talks but are used also by university personnel and school teachers in New Brunswick and the State of Maine.

Anyone wishing to borrow these products are requested to contact Geoscience Data Centre in Fredericton. (The address and telephone number are given on p. 14.)

Audiovisual media (film, video, photographic images) are an important part of the Public Awareness Programme under the MDA (1984-89) and the Division's own information awareness activities.

During the year, the Geoscience Data Centre assisted with the production of two audiovisual programmes, and updated the photographic image files of the Division.

One video will highlight the mineral resource industry of New Brunswick, especially the potential secondary manufacturing opportunities. Pre-production filming by Fiddlehead Film Productions Limited took place in the summer of 1986 (Figure 7). Aerial film footage of all major mining operations

was taken, followed by ground footage of plant sites, production methods and facilities, as well as end products. Additional filming will be part of the 1987 activities along with scripting and final editing. It is anticipated that this project will be completed by March, 1988.

Another video production, entitled "The Mineral Wealth of Atlantic Canada" was commenced in 1986 under the auspices of the Atlantic Geoscience Society. Primary funding for this project was received from the Canada-Nova Scotia and the Canada-New Brunswick Mineral Development agreements. Skerrett Communications Limited of Halifax was commissioned by Energy, Mines and Resources Canada, Communication Section to produce the film. This production should be ready for release in the first quarter of 1987.

PUBLIC AWARENESS In 1986, the Geoscience Data Centre had the opportunity to participate in developing and exhibiting three displays. The first display consisted of a series of panels showing some of the detailed field work being carried out by the geological staff of the Division. This exhibit was New Brunswick's contribution to the Provincial Geologists Displays at the 55th Annual Meeting and Convention of the Prospectors and Developers Association held in Toronto in March. The second exhibit was one specifically produced for the Division's eleventh annual Review of Activities and the 1986 District 1 Meeting of the Canadian Institute of Mining and Metallurgy in Halifax. Both were held in November. The latter exhibit was centred around the convention's theme of Mineral Investment in Atlantic Canada.

Figure 7. Pre-production filming at the Gordex mine site by Eric Bagnell of the Department (l) and Fred Clarke of Fiddlehead Film Productions (r).

Additional public awareness activities in 1986 included projects aimed at increasing the awareness of school students and teachers with respect to geology and mineral resources. In one project, interested teachers were provided with and asked to evaluate curriculum development kits containing information on such topics. These kits, which were purchased by Canada Department of Energy, Mines and Resources (EMR) under the MDA, were developed by and for the Canadian Institute of Mining and Metallurgy to facilitate greater exposure with respect to mineral resource topics in elementary schools.

To complement the above activities, Gwen Martin of Projects Unlimited was commissioned to survey the various schools in the Province to determine the interest among junior high school teachers in having a geologist talk to their Grade 7 classes about geology and mineral resources. The Province's Department of Education was very supportive of this move and, as a result of the survey, was flooded with requests for this service from the various school districts. As a result, Projects Unlimited was requested to produce a fifty minute programme that would be presented to the junior high schools. The programme, entitled "On the Rocks," began to take shape by year's end. Commencement of the tour is scheduled for the first quarter of 1987.

Under the MDA, both the Province, through the Department of Natural Resources and Energy, and the federal government through the Department of Energy, Mines and Resources can undertake projects separately or in the case of Public Awareness Programmes, can jointly fund or participate in projects.

Some of the projects that were managed by EMR - Communications Branch, but had input from the Department of Natural Resources and Energy, included the publication of the first MDA Newsletter entitled "Discoveries", and the 1985-86 MDA Annual Report.

Energy, Mines and Resources Canada personnel involved with the Public Awareness Programme of the MDA in 1986 included Edward Sampson (Regional Manager - Public Affairs), and Donna Maxwell (Assistant to the Regional Manager).

ADVANCED PROSPECTING COURSE In September of 1986, the second Advanced Prospecting Course was given in New Brunswick. Funding was provided under the MDA. A geological consultant, A. Wayne Lockhart, was hired to conduct the course, which included a full week's activities. Practical field applications were the emphasis of this course and concentration was on personal involvement in prospecting, staking claims, and conducting follow-up geochemical and geophysical surveys. Assisting Mr. Lockhart were several members from the New Brunswick mineral exploration industry.

Fifteen people registered for this course, which was held in the Newcastle area.

OTHER Three talks were given by D.J.J. Carroll: two at elementary schools, and one at the 1986 Mini-convention of the New Brunswick Branch of the Canadian Institute of Mining

and Metallurgy held in Bathurst in September. The topic was "The New Brunswick Department of Natural Resources and Energy, Mineral Resources Division: A Review of Programs and Services".

The Geoscience Data Centre also played host to an employee from the Department of Mineral Resources of the Royal Thai Government, who was on a fact-finding tour of several provincial agencies responsible for the distribution of geoscientific information.

MINERAL DEVELOPMENT BRANCH[8]

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The Mineral Development Branch is composed of the Director's office and seven sectors: Mineral Development, Process Studies Group, Mine Engineering, Mineral Lands, Mine Taxation and Statistics, and Staff Support (Administration and Word Processing). On January 1, 1987 several changes will take place. Mine taxation will be moved to the Department's Administration Branch and energy-related activities in the Mineral Development sector (shales, coal, oil and natural gas, and pipeline inspections) will be moved to the Energy Branch within the Minerals and Energy Division. In addition, since the Administration sector and the Word Processing sector service the three Branches within the Division, these sectors will report to the Assistant Deputy Minister.

EDITOR'S NOTE: As a result of the changes mentioned above, this report no longer will summarize the activities of the Division that deal with oil shales, coal, oil and natural gas, and pipeline inspections. These activities will be summarized in a separate report prepared by the Energy Branch.

The Mineral Development Branch's overall goals are to ensure that mineral deposits are developed at the optimum rate consistent with long-term income and employment objectives, to enhance the viability of marginally economic mineral deposits, to ensure that inactive mining operations are rehabilitated to a state that would avoid on-going costs to the public and, where possible can be economically productive in other uses, to ensure the highest degree of in-province processing and to maximize recovery, both in the mining and primary processing stages.

At year's end, the Mineral Development Branch administered the Mining Act, the Quarriable Substances Act and the Ownership of Minerals Act. Copies of these Acts and Regulations thereunder are available from the Queen's Printer.

RECLAMATION Ten reclamation plans were received in 1986 ranging from new operations, current operations and trenching programmes. The mining companies were maintaining the reclamation rate of disturbed lands in accordance with their submitted schedules.

Mineral Development Sector[9]

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In 1986, the staff of the Mineral Development Sector included Clinton St. Peter (Geologist, oil shales), Ronald Shaw (Geologist, coal, uranium), Timothy Webb (Geologist, industrial minerals) Jacques Thibault (Geologist, peat and coastal zone), Allen Seaman (Geologist, Quaternary), Paul O'Leary (Engineering Technician, quarriable substances), and Ronald Phillips (Engineering Technician, petroleum landman). A. Thomas Martel (Geologist, oil and natural gas) left the Division in 1986 to return to university. Subsequently, Ronald Shaw took over the responsibility for oil and natural gas.

In January of 1987, all responsibilities of the Branch pertaining to pipelines and underground storage, oil shale, oil and natural gas, and coal will be transferred to the Department's Energy Branch.

AGGREGATE RESOURCE INVENTORY[10] The accelerated programme of aggregate resource mapping and evaluation was completed in 1986. Reconnaissance-level mapping at a scale of 1:50 000 was conducted in the following NTS map areas: Grand Manan Island (21 B/10), Campobello Island (21 B/15 and B/14), St. George (21 G/2; northwest quarter), Hampstead (21 G/9; exclusive of C.F.B. Gagetown), Cape Spencer (21 H/4), Salmon River (21 H/6), and Waterford (21 H/11) (Figure 8).

As a result of the above work, aggregate resource maps at a scale of 1:50 000 are now available for all portions of the Province. A contract was awarded under the Canada-New Brunswick Mineral Development Agreement to Vanderklift Exploration Services of Fredericton, to simplify these maps and produce a granular aggregate resource atlas for New Brunswick, at a scale of 1:100 000. This atlas was designed to provide aggregate producers and land use planners with a regional overview of New Brunswick's granular aggregate resource base.

LIMESTONE[11] It is becoming increasingly important to sufficiently identify Provincial limestone deposits with respect to quality, apparent reserves, and factors affecting potential development in order to confront the anticipated rigid market requirements of the future. As a move in this direction, the New Brunswick Department of Natural Resources and Energy is currently re-examining and reassessing the Province's limestone resources, found principally in rocks of Precambrian, Silurian and Mississippian age (Figure 8). The project consists of 5 main phases that address such topics as historical development and current status of the limestone industry, and practical geologic aspects of known deposits and occurrences. A number of important deposit characteristics (grade ranges, reserves, development potential, etc.) will be combined into a computerized information retrieval system for quick reference.

The present status and related output of this project are summarized below and in Figure 9. The expected completion date of this limestone investigation is late in 1987.

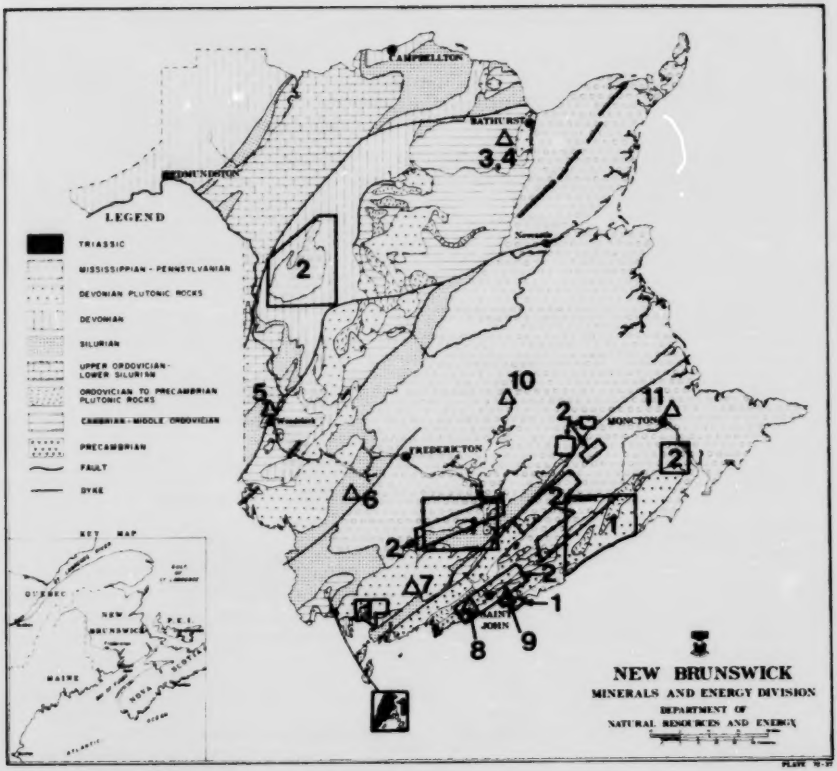

Figure 8. Areas in which Mineral Development Branch projects were conducted in 1986: (1) aggregate resource mapping; (2) limestone investigations; (3) Cu, Pb, Zn extraction; (4) Au extraction; (5) Mn, Ga, Ge extraction, Woodstock; (6) Sb, Au, Ga extraction, Lake George; (7) W, Mo, As, CaF_2, Y, REO extraction, Mount Pleasant; (8) Mg, Ca extraction, Lorneville; (9) Au extraction, Cape Spencer; (10) Ge, Ga extraction from fly ash, Grand Lake Power Station; (11) Ti, Ga, Ge extraction, Mud Creek.

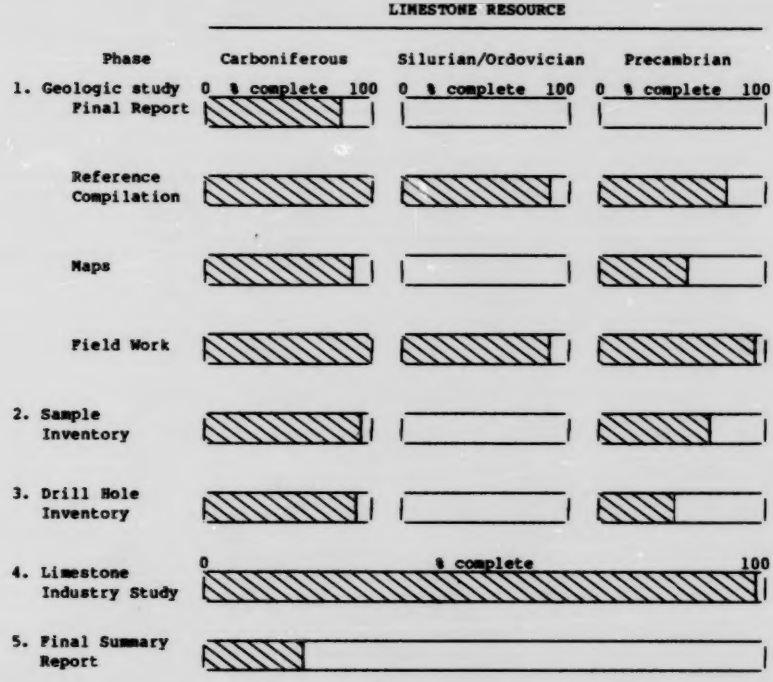

Figure 9. Status of the limestone resource inventory project in 1986.

The 1986 output of the limestone resource inventory project consists of: (1a) Draft report and accompanying 1:10 000 scale maps concerning various aspects of Carboniferous limestone deposits in the Province (these were submitted to the Division's editorial staff for revision); (1b) Computerized sample inventory having related information on more than 600 entries; (1c) Summary of relevant information for 350 drill holes, and setting up of a computerized data retrieval system; (1d) Preparation of a deposit classification and rating scheme to indicate future development potential. (2) A paper entitled 'Limestone in New Brunswick: past, present, and future' was presented at the 17th Annual Mini-convention of the New Brunswick Branch of the Canadian Institute of Mining and Metallurgy at Bathurst, N.B. in September. (3) A study concerning the 'Limestone industry in New Brunswick' was completed, and will be available as an Open File Report.

PEAT[12] Applications continued to be received for Peatland Exploration licences. A paper entitled "New Brunswick's Peat Moss Industry" was presented at the District 1 Meeting of the Canadian Institute of Mining and Metallurgy in Halifax, November 1986.

The Branch tendered a Peat Market Study under the current Canada-New Brunswick Mineral Development Agreement. The contract was awarded to The Coopers and Lybrand Consulting Group of Toronto, Ontario. The objective of the project is to review the present peat moss market in North America and in selected overseas countries, and to evaluate the potential for further development of these markets. The final report is expected to be presented in June 1987.

The Mineral Development Branch continued to actively support the Peat Research and Development Centre located in Shippagan. Under the current Canada-New Brunswick Mineral Development Agreement, a contract was awarded to the research centre to review the uses of peat as a soil additive in the agricultural sector. Results of this study are expected to be released early in April 1987.

COASTAL ZONE[12] Between September 10 and 14, 1986, the entire coastline of New Brunswick was filmed from a helicopter (Figure 10). The 11-hour colour video recording is expected to be released in 1987 as a Geological Survey of Canada Open File. The project was funded and directed by the Geological Survey of Canada; New Brunswick's Mineral Development Branch provided scientific assistance. Participation in the Canadian Coastal Sediment Study concluded in 1986 with the publication of the Final report by the National Research Council of Canada. Results of the 1983 field season measurements at Pointe-Sapin were summarized in the final report.

AGGREGATE MATERIALS[13] In New Brunswick, the rights to quarriable substances, including ordinary stone, building or construction stone, sand, gravel, clay and soil, are vested in the landowner who thereby controls extraction activities. Approximately 42% of the land area of the Province is Crown land. Removal of aggregate materials from Crown lands is regulated under the Quarriable Substances Act, with permits being issued by the Minister of Natural Resources and Energy.

Production of aggregates from Crown lands in 1986 was 2 807 718 t with a value of $4 200 000, compared to 3,020,000 t with a value of $3,780,000 in 1985.

Process Studies Group[14]

Process Engineer: J. Dean Thibault
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The overall goal of the Process Studies Group is to evaluate emerging technologies and processes, to liaise with industry and to recommend to the Province various ways in which research and development can be of assistance to the mineral industry of New Brunswick. The Mineral Processing Investigation Programme (MPIP) and the Mineral Investment Stimulation Programme (MISP) were established in July 1986 under

Figure 10. Aerial view of South Kouchibouguac Beach, which was filmed as part of the coastal zone project.

the Canada-New Brunswick Mineral Development Agreement for the purpose of providing technical and financial assistance to the New Brunswick mineral industry. The Department of Natural Resources and Energy (DNR&E) and Energy Mines and Resources (EMR) Canada Centre for Mineral and Energy Technology (Canmet) are working with industry in conducting seed development testing and advising in the development of projects. All MPIP projects are fully funded, whereas MISP projects are funded up to 50% by the federal government. MISP projects are carried out through contracts, whereas MPIP projects are conducted by the Process Studies Group.

The primary objective of the Process Studies Group as part of the Mineral Development Branch is to promote the development of metal extraction technology in New Brunswick. "Development" is defined as the engineering activity required to advance the technology of a metal extraction process to the point where it meets specific functional and economic requirements. In recognition of the limitations to mineral processing development within New Brunswick, an "incubation lab" was established by the Minerals and Energy Division. The operating objective of an incubation lab is to establish concepts of metal extraction possibilities and identify technical problems with milling of New Brunswick ores (Figures 11 and 12). These concepts are to undergo a technical and economic evaluation for commercialization to identify the need for large-scale research and development.

Figure 11. (l to r) Dean Thibault, Brent Blizzard, and Don Taylor testing the physical separation characteristics of gold ore in order to develop a flowsheet for the gravity concentration of gold from the ore.

Figure 12. George Sproul chemically treats wolframite concentrates to determine the possibilities of producing ammonium paratungstate.

The Process Studies Group staff responsible for administration of various development projects include: J. Dean Thibault, Process Engineer (the group leader who provides a technical background to metallurgical and chemical engineering concepts and develops commercialized mineral processing methods through a bench-scale lab program); Robert D. Harris, Project Engineer, MDA (who establishes preliminary feasibility studies to relate process studies to ore reserves and market possibilities, and makes contractual arrangements for research and development); Brent H. Blizzard, Metallurgical Engineering Technician, MDA (who manages in-plant and lab studies related to comminution and beneficiation of ores); George H. Sproul, Chemical Engineering Technician, MDA (who manages in-plant and lab studies related to hydro- and pyrometallurgy).

Previous to the Mineral Processing Investigation and Mineral Investment Stimulation programmes, a study was conducted by the Minerals and Energy Division on limitations to mineral processing within New Brunswick. In consultation with industry and various departments within government, major limitations to development which lead to the administration of these programs were identified as:

1. Grass-Roots Development: A fair number of the diversified mineral reserves that have been identified within New Brunswick have complex mineralogy; however, there is limited background data on mineral separation characteristics and technologies to favour the economics of ore development. In order to strengthen grass-roots development, mineral processing alternatives have to be identified with respect to various market options.

2. Optimization of Mill Operations: Most operators recognize that technical support staff who specialize in complex metal extraction are necessary to improve milling efficiency. Economic indicators suggest that the future development of mining in New Brunswick will proceed through the opening of many small installations. They will require technical support without an increased financial burden. Assistance can be provided by analysis of perceived problems followed by controlled in-plant analysis and/or bench-scale evaluations.

3. Problem Identification and Technology Transfer: A clear definition of problems related to mineral recovery and metal extraction systems must be identified for various ore types of New Brunswick. Information can be directed to research and development so that unbias approaches are undertaken to resolve technical constraints and to benefit industry. An understanding of mineral processing problems by "hands on" experience also strengthens constructive government-funded research and development.

MINERAL PROCESSING INVESTIGATIONS PROGRAMME (MPIP)
Projects that solve metallurgical processing problems and promote orebody development are being carried out by the Process Studies Group. The following MPIP projects are aimed at identifying the limitations to metal and mineral extraction efficiency, so that research and development work can be directed toward topics of immediate benefit to the industry of New Brunswick.

1. Optimization of Grade and Recovery at Durham Resources Inc. Mine - Sampling of the entire circuit will be carried out under steady-state conditions to establish data on recirculating loads, classification efficiencies and a mass balance. Bench-scale testing will be carried out to determine optimum liberation size. Operating data on the limitations to ore separability will be established and recommendations for optimizing grade-recovery will be made.

2. Leachability of New Brunswick's Gold Ores - Low-grade gold deposits of New Brunswick that were once considered uneconomic are now being exploited because of improvements in extraction technology and treatment of oxidizing effluents. Limited technical information exists on the leachability of New Brunswick precious metal ores using heap leaching methods. The project will examine the technical feasibility for leaching and possible recoveries of metal.

3. Extraction Possibilities of Specialty Metals - Various documents have suggested high growth potential for metals used in electronics, specialty ceramics, catalysts, alloys, and chemicals. The project will identify the sources of such specialty metals as titanium, gallium, germanium, indium, lithium, magnesium, yttrium, and rare earths from various ores and tailings within the Province. Bench-scale testing of alternative extraction methods will be carried out to indicate technical-economic feasibilities.

4. Further Processing of Antimony Concentrates - The project will review various commercial technologies available for producing an oxide or a metal from sulphide concentrates. Bench-scale tests of process options will be used to identify the technical bottlenecks of oxide and/or metal production.

5. Beneficiation of Complex Sulphide Ores for Add-on Processing - Pyrometallurgical and hydrometallurgical processing routes are becoming more attractive for improved recovery of complex sulphide metals; however, limited technical information exists on the optimization of a flowsheet and grade and recovery relationships for production of bulk concentrates. The project is aimed at providing some technical background for custom milling.

6. Process Development on Mount Pleasant Ore - The North Fire Tower zone at Mount Pleasant contains a complex mixture of tungsten, molybdenum, tin, fluorspar and various possible sulphides that are metallurgically quite difficult to separate. The project will investigate various possible flowsheet configurations and identify the relationships between grade and recovery as a function of grind.

MINERAL INVESTMENT STIMULATION PROGRAMME (MISP) The objective of this programme is to stimulate the development of the Province's mineral resources. This is done by providing funding and technical assistance to the mining industry of New Brunswick for the implementation of development projects and studies which are consistent with this objective. Projects are eligible for financial assistance if they have the potential of extending the reserves of established mineral deposits, improving processing technology and plant productivity, and establishing and/or expanding long-term markets. For an approved project, the MISP will contribute up to 50% of the total cost, to a maximum of $50 000.

To date, seven projects proposed by industry have been approved for funding under the MISP, which has a total commitment of approximately $155 000 of the $1 000 000 allocated to this programme. These projects were proposed by Durham Resources Inc. and Brunswick Mining and Smelting Corporation Limited and are dealing with process development of their respective plants. A unique feature of this programme is that it gives the participant more of a controlling edge with respect to the types of projects he would like to see done and the extent to which he would like to pursue them.

Mine Engineering Sector[8]

Mining Engineer: Jagdesh J. Chandra
Address: P.O. Box 6000, Fredericton, N.B. E3B 5H1
Telephone: 453-2206

The Mine Engineering Sector is responsible for the inspection and evaluation of mining plans, for carrying out economic analysis and compiling mining statistics, and for administering certain portions of the Mineral Development Agreement. During 1985 these activities were carried out under the supervision of the Mining Engineer, J.J. Chandra, prior to his taking up a position with the Department of Commerce and Technology in October, 1986.

Staff Support (Administration and Word Processing)[15]

Administrative Services Officer: Sandra L. Devenney
Address: P.O. Box 6000, Fredericton, N.B. E3B 5H1
Telephone: 453-2206

Staff support in 1986 was provided by Sandra DeVenney (Administrative Services Officer), Linda Ward (Secretary I), Diane Blair (Clerk-typist III), Shelley Stephens (Clerk-Typist III), Carol Grant (Clerk-typist III), and Scotty Munn (Clerk-Typist II, MDA).

The provincial budget for the Minerals and Energy Divison for fiscal year 1986-87 was $2 717 477, which represented an increase of $714 966 over the previous year (Figure 13). This increase was due to the addition of the Energy Branch budget to that of the Division.

The federal/provincial agreement (Mineral Development, and Energy) budgets for fiscal year 1986-87 totalled $2 317 450. Expenditures amounted to $1 854 040.81.

Mineral Lands Section[16]

Chief Mining Recorder: Douglas D.W. Bailey
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Telephone: 453-2206

The Mineral Lands Section processes and maintains records pertaining to the disposition of Crown-owned mineral rights. Mining claims are recorded and prospecting licences

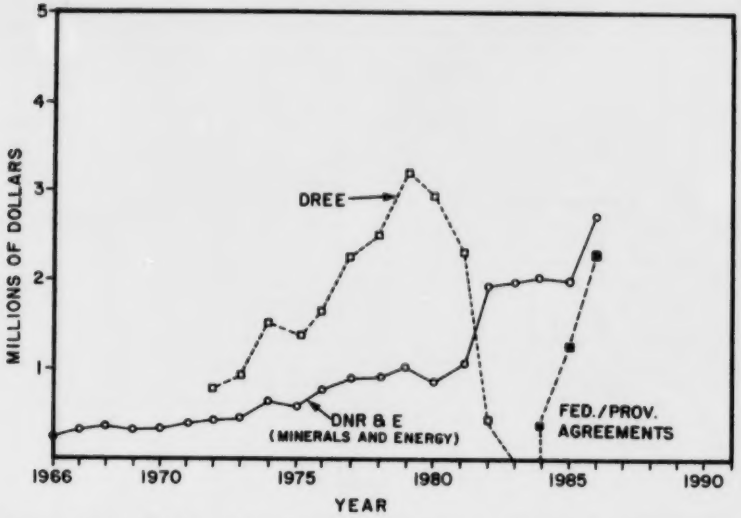

Figure 13. Budget of Minerals and Energy Division, 1966-1986. Federal/provincial agreements includes Mineral Development and Energy agreements in 1986.

are sold in Fredericton and at the Regional Offices in Bathurst and Sussex.

The Mineral Lands staff in 1986 consisted of D.D.W. Bailey (Chief Mining Recorder), E.V. Jackson (Deputy Recorder), and Fred Edney (Draftsman).

The new Mining Act, Chapter M-14.1, and the new General Regulation 86-98 went into effect on July 6, 1986.

Table 1 presents mineral lands statistics for 1986. The number of claims staked in each of the metallogenic zones is illustrated in Figure 14 and the total annual expenditures reported for assessment credit (1954-1986) are given in Figure 15.

During 1986, the project of entering mineral claims data into the computer continued.

Mine Taxation and Statistics[17]

Mine Assessor: Wayne R. Carr
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Telephone: 453-2468

The Mine Assessor, W.R. Carr, is responsible for the collection of all revenue due the Province from mineral taxation and royalties. The mines subject to the Metallic

Table 1
Mineral Lands Statistics, 1986

	No.	Claim Equivalent	Hectares	% Inc. Over Prev. Year (Decrease)
Prospecting Licences Sold	311	-	-	(6.3)
Claims Recorded	2 772	2 772	44 352	(45.4)
Claims Renewed	6 137	6 137	98 192	49.1
Claims Expired	2 923	2 923	46 768	(14.0)
Claims in Effect[1]	9 051	9 051	144 816	(1.6)
Mining Licences Issued[2]	3	106	1 696	(64.3)
Mining Licences Renewed	122	4 540	72 640	(13.6)
Mining Licences Expired	20	1 009	16 144	154.8
Mining Licences in Effect[1]	125	4 646	74 336	(16.3)
Coal Licences in Effect[1]	1	5 818	93 088	0
Potash Leases in Effect[1]	3	2 355	38 130	0
Other Leases in Effect[1]	4	437	7 106	0
Total Claims and Claim Equivalents in Effect	-	22 307	356 912	(4.5)
Oil-Gas Licences	35	-	797 574	(36.4)
Oil-Gas Leases	9	-	46 423	2 053
Bituminous Shale Licences	1	-	8 998	0
Bituminous Shale Development Permits	-	-	-	-
Bituminous Shale Leases	1	-	1 439	100.0
Underground Storage Licences	-	-	-	-
Underground Storage Leases	-	-	-	-
Quarry Permits	284	-	-	(11.5)
Quarry Leases	8	-	494.2	-
Peat Licences	1	-	218	-
Peat Leases	25	-	9 890.5	(6.1)
Potash Exploration Reservations	-	-	-	-
	No.	**Depth (m)**	**Expenditures ($)**	
Assessment Reports Submitted	102			
Value of Assessment Reports Received			2 523 368	
Total Drilling (Metres)		13 722		
Drilling Value			764 326	
No. of Holes	100			
Potash Exploration				
No. of Holes	-	-	-	
Total Depth		-		
Oil-Gas Exploration				
No. of Holes	1		Not Avail.	
Total Depth		2100		
Bituminous Shale Exploration				
Number of Holes	1		Not Avail.	
Total Depth		105.8		

[1]In effect at year's end.
[2]After July 6, 1986, mining licences no longer issued.

Minerals Tax Act submit annual tax returns, which are reviewed, and additional assessments are issued if necessary. Taxes due under the Metallic Minerals Tax Act are monitored and collected on a regular basis as required by the Act.

Royalties from coal and natural gas are collected monthly, whereas royalties from potash, salt and oil are collected quarterly, and royalties from peat moss, sand and gravel are collected semi-annually.

Regular monthly statistical reports are submitted by producing mines and contain information on production, shipments, manpower, energy consumption, etc. This information along with commodity prices, U.S. exchange rates, forecasted capital expenditures is compiled into a statistical summary report and distributed monthly.

The Mine Assessors from each province meet annually to discuss topics related to taxation, royalties, and legislation. In June, the Mine Assessor's Conference was held in Saint Andrews, N.B. (Figure 16).

MINING COMMISSIONER'S REPORT[18]

Mining Commissioner: William I. Spence
Address: P.O. Box 730, Woodstock, N.B. E0J 2B0
Telephone: 328-2105

There were no disputes brought to the attention of the Mining Commissioner during the calendar year 1986.

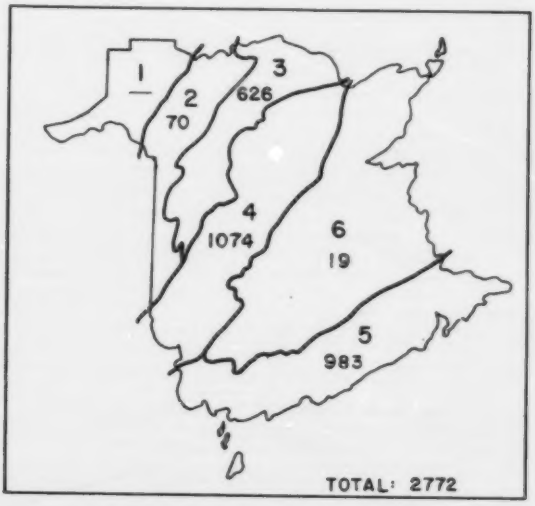

Figure 14. Number of claims staked by metallogenic region in 1986.

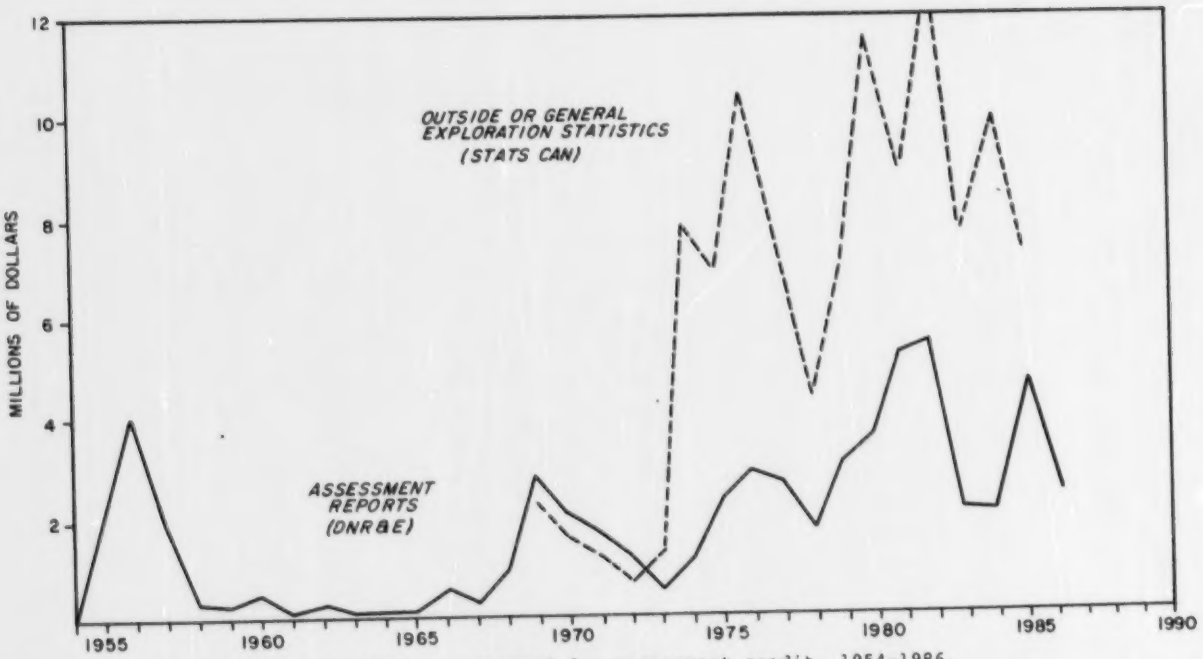

Figure 15. Total annual expenditures reported for assessment credit, 1954-1986.

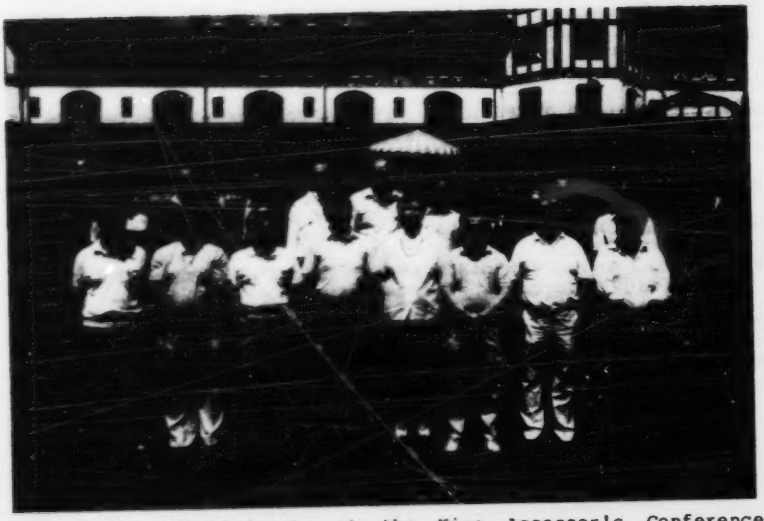

Figure 16. Participants at the Mine Assessor's Conference were: (front row, l to r): Richard Rose, Ont.; Garry MacEwen, N.B.; K. Rachamalla, Ont.; Dallas Senft, Sask.; Linda Ward, N.B.; Blair McMullin, N.S.; Roger Robitalle, Que.; Paul O'Leary, N.B.; (back row, l to r) Robin Varley, Alta.; Stan Puchniak, Man.; Tony MacAllister, Nfld.; Leon Ballageer, Man.; Wayne Carr, N.B.; Carroll James, N.S.; George Greer, N.B.; Harold Cormick, Alta.; and Steve Zurwaski, Sask.

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Granular aggregate resource maps. Gartner Lee Associates Ltd. (1986). Scale: 1:50 000. To accompany Open File Report 86-4.

MP 86-1 Wild Goose Lake (21 N/16).
MP 86-2 Grand River (21 O/5).
MP 86-3 Kedgwick (21 O/11).
MP 86-4 Gounamitz River (21 O/12).
MP 86-5 States Brook (21 O/13).
MP 86-6 Menneval (21 O/14).

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MP 86-7A Big Bald Mountain, east half (21 O/1E).
MP 86-7B Big Bald Mountain, west half (21 O/1W).
MP 86-8 Serpentine Lake (21 O/2).
MP 86-9A California Lake, east half (21 O/8E).
MP 86-9B California Lake, west half (21 O/8W).

MP 86-10 Geology of Big Bald Mountain (21 O/1). R.R. Irrinki. (1986). Scale: 1:50 000. To accompany Map Report 86-2.

Chester sulphide deposit (21 O/1). R.R. Irrinki. (1986).

MP 86-11 Surface geology. Scale: 1 inch equals 400 feet.
MP 86-12 Surface drill hole plan. Scale: 1 inch equals 400 feet.
MP 86-13 Longitudinal sections. Scale: 1 inch equals 100 feet.
MP 86-14 Cross sections. Scale: 1 inch equals 100 feet.

Chester sulphide deposit (21 O/1). R.R. Irrinki. (1986). To accompany Map Report 86-2.

MP 86-11A Surface geology. Scale: 1 inch equals 500 feet.
MP 86-12A Surface drill hole plan. Scale: 1 inch equals 250 feet.
MP 86-13A Longitudinal sections. Scale: 1 inch equals 150 feet.
MP 86-14A Cross sections. Scale: 1 inch equals 150 feet.

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MP 86-16 General inventory map - section Ia. (21 J/1)
MP 86-17 General inventory map - section Ib. (21 J/1)
MP 86-18 General inventory map - section IIa. (21 J/1)
MP 86-19 General inventory map - section IIb. (21 J/1)
MP 86-20 General inventory map - section IIc. (21 J/1)
MP 86-21 General inventory map - section IIIa. (21 I/4)
MP 86-22 General inventory map - section IIIb. (21 I/4)
MP 86-23 General inventory map - section IV. (21 I/4)
MP 86-24 General inventory map - section V. (21 I/4)
MP 86-25 Forest cover map - section Ia. (21 J/1)
MP 86-26 Forest cover map - section Ib. (21 J/1)
MP 86-27 Forest cover map - section IIa. (21 J/1)
MP 86-28 Forest cover map - section IIb. (21 J/1)
MP 86-29 Forest cover map - section IIc. (21 J/1)
MP 86-30 Forest cover map - section IIIa. (21 I/4)
MP 86-31 Forest cover map - section IIIb. (21 I/4)
MP 86-32 Forest cover map - section IV. (21 I/4)
MP 86-33 Forest cover map - section V. (21 I/4)
MP 86-34 Property map - section Ia. (21 J/1)
MP 86-35 Property map - section Ib. (21 J/1)
MP 86-36 Property map - section IIa. (21 J/1)
MP 86-37 Property map - section IIb. (21 J/1)
MP 86-38 Property map - section IIc. (21 J/1)
MP 86-39 Property map - section IIIa. (21 I/4)
MP 86-40 Property map - section IIIb. (21 I/4)
MP 86-41 Property map - section IV. (21 I/4)
MP 86-42 Property map - section V. (21 I/4)

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MP 86-43 Surficial geology.
MP 86-44 Till geochemistry, gold, humus and B-horizon in ppb.
MP 86-45 Till geochemistry, arsenic, B-horizon in ppm.
MP 86-46 Till geochemistry, silver, B-horizon in ppm.
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MP 86-50 Airborne VLF survey, Miramichi Highland region (21 J/10,15,16; 21 O/1,2,7,8). Scale: 1:250 000.
MP 86-51A K %, Hayesville, east half (21 J/10E).
MP 86-51B Equivalent U/equivalent Th, Hayesville, east half (21 J/10E).
MP 86-51C (Equivalent Th/K)10^4, Hayesville, east half (21 J/10E).
MP 86-51D (Equivalent U/K)10^4, Hayesville, east half (21 J/10E).
MP 86-51E Equivalent Th ppm, Hayesville, east half (21 J/10E).
MP 86-51F Equivalent U ppm, Hayesville, east half (21 J/10E).
MP 86-51G Total count U, Hayesville, east half (21 J/10E).

MP 86-52A K %, Tuadook Lake (21 J/15).
MP 86-52B Equivalent U/equivalent Th, Tuadook Lake (21 J/15).
MP 86-52C (Equivalent Th/K)10^4, Tuadook Lake (21 J/15).
MP 86-52D (Equivalent U/K)10^4, Tuadook Lake (21 J/15).
MP 86-52E Equivalent Th ppm, Tuadook Lake (21 J/15).
MP 86-52F Equivalent U ppm, Tuadook Lake (21 J/15).
MP 86-52G Total count U, Tuadook Lake (21 J/15).
MP 86-53A K %, McKendrick Lake (21 J/16).
MP 86-53B Equivalent U/equivalent Th, McKendrick Lake (21 J/16).
MP 86-53C (Equivalent Th/K)10^4, McKendrick Lake (21 J/16).
MP 86-53D (Equivalent U/K)10^4, McKendrick Lake (21 J/16).
MP 86-53E Equivalent Th ppm, McKendrick Lake (21 J/16).
MP 86-53F Equivalent U ppm, McKendrick Lake (21 J/16).
MP 86-53G Total count U, McKendrick Lake (21 J/16).
MP 86-54A K %, Big Bald Mountain (21 O/1).
MP 86-54B Equivalent U/equivalent Th, Big Bald Mountain (21 O/1).
MP 86-54C (Equivalent Th/K)10^4, Big Bald Mountain (21 O/1).
MP 86-54D (Equivalent U/K)10^4, Big Bald Mountain (21 O/1).
MP 86-54E Equivalent Th ppm, Big Bald Mountain (21 O/1).
MP 86-54F Equivalent U ppm, Big Bald Mountain (21 O/1).
MP 86-54G Total count U, Big Bald Mountain (21 O/1).
MP 86-55A K %, Serpentine Lake (21 O/2).
MP 86-55B Equivalent U/equivalent Th, Serpentine Lake (21 O/2).
MP 86-55C (Equivalent Th/K)10^4, Serpentine Lake (21 O/2).
MP 86-55D (Equivalent U/K)10^4, Serpentine Lake (21 O/2).
MP 86-55E Equivalent Th ppm, Serpentine Lake (21 O/2).
MP 86-55F Equivalent U ppm, Serpentine Lake (21 O/2).
MP 86-55G Total count U, Serpentine Lake (21 O/2).
MP 86-56A K %, Nepisiguit Lakes (21 O/7).
MP 86-56B Equivalent U/equivalent Th, Nepisiguit Lakes (21 O/7).
MP 86-56C (Equivalent Th/K)10^4, Nepisiguit Lakes (21 O/7).
MP 86-56D (Equivalent U/K)10^4, Nepisiguit Lakes (21 O/7).
MP 86-56E Equivalent Th ppm, Nepisiguit Lakes (21 O/7).
MP 86-56F Equivalent U ppm, Nepisiguit Lakes (21 O/7).
MP 86-56G Total count U, Nepisiguit Lakes (21 O/7).
MP 86-57A K %, California Lake (21 O/8).
MP 86-57B Equivalent U/equivalent Th, California Lake (21 O/8).
MP 86-57C (Equivalent Th/K)10^4, California Lake (21 O/8).
MP 86-57D (Equivalent U/K)10^4, California Lake (21 O/8).
MP 86-57E Equivalent Th ppm, California Lake (21 O/8).
MP 86-57F Equivalent U ppm, California Lake (21 O/8).
MP 86-57G Total count U, California Lake (21 O/8).

Stream sediment geochemistry survey, Connors (21 N/2e). J.L. Davies. (1986). Scale: 1:20 000.

MP 86-58A Copper, lead, zinc.
MP 86-58B Manganese, iron.
MP 86-58C Silver, cobalt.
MP 86-58D Nickel.
MP 86-58E Molybdenum, tungsten.
MP 86-58F Uranium

Stream sediment geochemistry survey, Connors (21 N/2f). J.L. Davies. (1986). Scale: 1:20 000.

MP 86-59A Copper, lead, zinc.
MP 86-59B Manganese, iron.
MP 86-59C Silver, cobalt.
MP 86-59D Nickel.
MP 86-59E Molybdenum, tungsten.
MP 86-59F Uranium

Stream sediment geochemistry survey, Connors (21 N/2g). J.L. Davies. (1986). Scale: 1:20 000.

MP 86-60A Copper, lead, zinc.
MP 86-60B Manganese, iron.
MP 86-60C Silver, cobalt.
MP 86-60D Nickel.
MP 86-60E Molybdenum, tungsten.
MP 86-60F Uranium

Stream sediment geochemistry survey, Estcourt (21 N/6a). J.L. Davies. (1986). Scale: 1:20 000.

MP 86-61A Copper, lead, zinc.
MP 86-61B Manganese, iron.
MP 86-61C Silver, cobalt.
MP 86-61D Nickel.
MP 86-61E Molybdenum, tungsten.
MP 86-61F Uranium

Stream sediment geochemistry survey, Lac Baker (21 N/7a). J.L. Davies. (1986). Scale: 1:20 000.

MP 86-62A Copper, lead, zinc.
MP 86-62B Manganese, iron.
MP 86-62C Silver, cobalt.
MP 86-62D Nickel.
MP 86-62E Molybdenum, tungsten.
MP 86-62F Uranium

Stream sediment geochemistry survey, Lac Baker (21 N/7b). J.L. Davies. (1986). Scale: 1:20 000.

MP 86-63A Copper, lead, zinc.
MP 86-63B Manganese, iron.
MP 86-63C Silver, cobalt.
MP 86-63D Nickel.
MP 86-63E Molybdenum, tungsten.
MP 86-63F Uranium

Stream sediment geochemistry survey, Lac Baker (21 N/7c). J.L. Davies. (1986). Scale: 1:20 000.

MP 86-64A Copper, lead, zinc.
MP 86-64B Manganese, iron.
MP 86-64C Silver, cobalt.
MP 86-64D Nickel.
MP 86-64E Molybdenum, tungsten.
MP 86-64F Uranium

Stream sediment geochemistry survey, Lac Baker (21 N/7d). J.L. Davies. (1986). Scale: 1:20 000.

MP 86-65A Copper, lead, zinc.
MP 86-65B Manganese, iron.
MP 86-65C Silver, cobalt.
MP 86-65D Nickel.
MP 86-65E Molybdenum, tungsten.
MP 86-65F Uranium

Stream sediment geochemistry survey, Lac Baker (21 N/7g). J.L. Davies. (1986). Scale: 1:20 000.

MP 86-66A Copper, lead, zinc.
MP 86-66B Manganese, iron.
MP 86-66C Silver, cobalt.
MP 86-66D Nickel.
MP 86-66E Molybdenum, tungsten.
MP 86-66F Uranium

	Stream sediment geochemistry survey, Lac Baker (21 N/7h). J.L. Davies. (1986). Scale: 1:20 000.
MP 86-67A	Copper, lead, zinc.
MP 86-67B	Manganese, iron.
MP 86-67C	Silver, cobalt.
MP 86-67D	Nickel.
MP 86-67E	Molybdenum, tungsten.
MP 86-67F	Uranium
	Stream sediment geochemistry survey, Edmundston (21 N/8a). J.L. Davies. (1986). Scale: 1:20 000.
MP 86-68A	Copper, lead, zinc.
MP 86-68B	Manganese, iron.
MP 86-68C	Silver, cobalt.
MP 86-68D	Nickel.
MP 86-68E	Molybdenum, tungsten.
MP 86-68F	Uranium
	Stream sediment geochemistry survey, Edmundston (21 N/8b). J.L. Davies. (1986). Scale: 1:20 000.
MP 86-69A	Copper, lead, zinc.
MP 86-69B	Manganese, iron.
MP 86-69C	Silver, cobalt.
MP 86-69D	Nickel.
MP 86-69E	Molybdenum, tungsten.
MP 86-69F	Uranium
	Stream sediment geochemistry survey, Edmundston (21 N/8c). J.L. Davies. (1986). Scale: 1:20 000.
MP 86-70A	Copper, lead, zinc.
MP 86-70B	Manganese, iron.
MP 86-70C	Silver, cobalt.
MP 86-70D	Nickel.
MP 86-70E	Molybdenum, tungsten.
MP 86-70F	Uranium
	Stream sediment geochemistry survey, Edmundston (21 N/8d). J.L. Davies. (1986). Scale: 1:20 000.
MP 86-71A	Copper, lead, zinc.
MP 86-71B	Manganese, iron.
MP 86-71C	Silver, cobalt.
MP 86-71D	Nickel.
MP 86-71E	Molybdenum, tungsten.
MP 86-71F	Uranium
	Stream sediment geochemistry survey, Edmundston (21 N/8e). J.L. Davies. (1986). Scale: 1:20 000.
MP 86-72A	Copper, lead, zinc.
MP 86-72B	Manganese, iron.
MP 86-72C	Silver, cobalt.
MP 86-72D	Nickel.
MP 86-72E	Molybdenum, tungsten.
MP 86-72F	Uranium
	Stream sediment geochemistry survey, Edmundston (21 N/8f). J.L. Davies. (1986). Scale: 1:20 000.
MP 86-73A	Copper, lead, zinc.
MP 86-73B	Manganese, iron.
MP 86-73C	Silver, cobalt.
MP 86-73D	Nickel.
MP 86-73E	Molybdenum, tungsten.
MP 86-73F	Uranium

Stream sediment geochemistry survey, Edmundston (21 N/8g). J.L. Davies. (1986). Scale: 1:20 000.

MP 86-74A Copper, lead, zinc.
MP 86-74B Manganese, iron.
MP 86-74C Silver, cobalt.
MP 86-74D Nickel.
MP 86-74E Molybdenum, tungsten.
MP 86-74F Uranium

Stream sediment geochemistry survey, Edmundston (21 N/8h). J.L. Davies. (1986). Scale: 1:20 000.

MP 86-75A Copper, lead, zinc.
MP 86-75B Manganese, iron.
MP 86-75C Silver, cobalt.
MP 86-75D Nickel.
MP 86-75E Molybdenum, tungsten.
MP 86-75F Uranium

Stream sediment geochemistry survey, silt sample numbers. J.L. Davies. (1986). Scale: 1:20 000.

MP 86-76A Connors (21 N/2e).
MP 86-76B Connors (21 N/2f).
MP 86-76C Connors (21 N/2g).
MP 86-76D Estcourt (21 N/6a).
MP 86-76E Lac Baker (21 N/7a).
MP 86-76F Lac Baker (21 N/7b).
MP 86-76G Lac Baker (21 N/7c).
MP 86-76H Lac Baker (21 N/7d).
MP 86-76I Lac Baker (21 N/7g).
MP 86-76J Lac Baker (21 N/7h).
MP 86-76K Edmundston (21 N/8a).
MP 86-76L Edmundston (21 N/8b).
MP 86-76M Edmundston (21 N/8c).
MP 86-76N Edmundston (21 N/8d).
MP 86-76O Edmundston (21 N/8e).
MP 86-76P Edmundston (21 N/8f).
MP 86-76Q Edmundston (21 N/8g).
MP 86-76R Edmundston (21 N/8h).

MP 86-80A Provenance map, Waterford (21 H/11). A.T. Martel. (1986). Scale: 1:50 000.
MP 86-80B Reservoir characteristics of surface showings, Waterford (21 H/11). A.T. Martel. (1986). Scale: 1:50 000.
MP 86-80C Rock sample locations, Waterford (21 H/11). A.T. Martel. (1986). Scale: 1:50 000.

MP 86-81A Provenance map, Sussex (21 H/12). A.T. Martel. (1986). Scale: 1:50 000.
MP 86-81B Reservoir characteristics of surface showings, Sussex (21 H/12). A.T. Martel. (1986). Scale: 1:50 000.
MP 86-81C Rock sample locations, Sussex (21 H/12). A.T. Martel. (1986). Scale: 1:50 000.

MP 86-82A Provenance map, Petitcodiac (21 H/14). A.T. Martel. (1986). Scale: 1:50 000.
MP 86-82B Reservoir characteristics of surface showings, Petitcodiac (21 H/14). A.T. Martel. (1986). Scale: 1:50 000.
MP 86-82C Rock sample locations, Petitcodiac (21 H/14). A.T. Martel. (1986). Scale: 1:50 000.

MP 86-83A Provenance map, Hillsborough (21 H/15). A.T. Martel. (1986). Scale: 1:50 000.
MP 86-83B Reservoir characteristics of surface showings, Hillsborough (21 H/15). A.T. Martel. (1986). Scale: 1:50 000.
MP 86-83C Rock sample locations, Hillsborough (21 H/15). A.T. Martel. (1986). Scale: 1:50 000.

MP 86-84 Provenance map and reservoir characteristics of surface showings, Moncton (21 I/2). A.T. Martel. (1986). Scale: 1:50 000.

MP 86-85 Provenance map and reservoir characteristics of surface showings, Salisbury (21 I/3). A.T. Martel. (1986). Scale: 1:50 000.

Seismic shotpoint location maps, southeastern New Brunswick. A.T. Martel. (1986). Scale: 1:50 000.
MP 86-86 Alma (21 H/10).
MP 86-87 Waterford (21 H/11).
MP 86-88 Sussex (21 H/12).
MP 86-89 Codys (21 H/13).
MP 86-90 Petitcodiac (21 H/14).
MP 86-91 Hillsborough (21 H/15).
MP 86-92 Amherst (21 H/16).
MP 86-93 Port Elgin (21 I/1).
MP 86-94 Moncton (21 I/2).
MP 86-95 Salisbury (21 I/3).
MP 86-96 Harcourt (21 I/6).
MP 86-97 Buctouche (21 I/7).

Seismic shotpoint location maps. A.T. Martel. (1986). Scale: 1:125 000.
MP 86-98 Southeastern New Brunswick and Northumberland Strait (21 I).
MP 86-99 Southern New Brunswick (21 H, I).
MP 86-100 Bay of Fundy (21 H).

Geophysical series maps of airborne gamma-ray spectrometric, VLF-EM, and magnetic surveys, St. George-Saint John region, New Brunswick. Geological Survey of Canada. (1986). Scale: 1:50 000, unless otherwise stated.
MP 86-101A K %, Musquash (21 G/1).
MP 86-101B Equivalent U/equivalent Th, Musquash (21 G/1).
MP 86-101C (Equivalent Th/K)10^4, Musquash (21 G/1).
MP 86-101D (Equivalent U/K)10^4, Musquash (21 G/1).
MP 86-101E Equivalent Th ppm, Musquash (21 G/1).
MP 86-101F Equivalent U ppm, Musquash (21 G/1).
MP 86-101G Total count U, Musquash (21 G/1).
MP 86-102A K %, St. George (21 G/2).
MP 86-102B Equivalent U/equivalent Th, St. George (21 G/2).
MP 86-102C (Equivalent Th/K)10^4, St. George (21 G/2).
MP 86-102D (Equivalent U/K)10^4, St. George (21 G/2).
MP 86-102E Equivalent Th ppm, St. George (21 G/2).
MP 86-102F Equivalent U ppm, St. George (21 G/2).
MP 86-102G Total count U, St. George (21 G/2).
MP 86-103A K %, McDougall Lake (21 G/7).
MP 86-103B Equivalent U/equivalent Th, McDougall Lake (21 G/7).
MP 86-103C (Equivalent Th/K)10^4, McDougall Lake (21 G/7).
MP 86-103D (Equivalent U/K)10^4, McDougall Lake (21 G/7).
MP 86-103E Equivalent Th ppm, McDougall Lake (21 G/7).

MP 86-103F Equivalent U ppm, McDougall Lake (21 G/7).
MP 86-103G Total count U, McDougall Lake (21 G/7).
MP 86-104A K %, Saint John (21 G/8) and part of Hampstead (21 G/9).
MP 86-104B Equivalent U/equivalent Th, Saint John (21 G/8) and part of Hampstead (21 G/9).
MP 86-104C (Equivalent Th/K)10^4, Saint John (21 G/8) and part of Hampstead (21 G/9).
MP 86-104D (Equivalent U/K)10^4, Saint John (21 G/8) and part of Hampstead (21 G/9).
MP 86-104E Equivalent Th ppm, Saint John (21 G/8) and part of Hampstead (21 G/9).
MP 86-104F Equivalent U ppm, Saint John (21 G/8) and part of Hampstead (21 G/9).
MP 86-104G Total count U, Saint John (21 G/8) and part of Hampstead (21 G/9).
MP 86-105 VLF-EM profile map of the entire survey area (21 G/1,2,7,8). Scale: 1:250 000.

Stream sediment geochemistry survey, Heath Steele (21 O/8a). J.L. Davies. (1986). Scale: 1:20 000.
MP 86-106A Copper, lead, zinc.
MP 86-106B Manganese, iron.
MP 86-106C Silver, cobalt.
MP 86-106D Nickel.
MP 86-106E Molybdenum, tungsten.

Stream sediment geochemistry survey, North Little River Lake (21 O/8b). J.L. Davies. (1986). Scale: 1:20 000.
MP 86-107A Copper, lead, zinc.
MP 86-107B Manganese, iron.
MP 86-107C Silver, cobalt.
MP 86-107D Nickel.
MP 86-107E Molybdenum, tungsten.

Stream sediment geochemistry survey, California Lake (21 O/8g). J.L. Davies. (1986). Scale: 1:20 000.
MP 86-108A Copper, lead, zinc.
MP 86-108B Manganese, iron.
MP 86-108C Silver, cobalt.
MP 86-108D Nickel.
MP 86-108E Molybdenum, tungsten.

Stream sediment geochemistry survey, Nepisiguit River (21 O/8h). J.L. Davies. (1986). Scale: 1:20 000.
MP 86-109A Copper, lead, zinc.
MP 86-109B Manganese, iron.
MP 86-109C Silver, cobalt.
MP 86-109D Nickel.
MP 86-109E Molybdenum, tungsten.

Stream sediment geochemistry survey, silt sample numbers. J.L. Davies. (1986). Scale: 1:20 000.
MP 86-110A Heath Steele (21 O/8a).
MP 86-110B North Little River Lake (21 O/8b).
MP 86-110C California Lake (21 O/8g).
MP 86-110D Nepisiguit River (21 O/8h).

Base maps of 21 O/8 (California Lake) and 21 P/5 (Nepisiguit Falls). Maritime Resource Management Service. (1986). Scale: 1:10 000.

MP 86-111	21 O/8-101
MP 86-112	21 O/8-102
MP 86-113	21 O/8-103
MP 86-114	21 O/8-104
MP 86-115	21 O/8-105
MP 86-116	21 O/8-201
MP 86-117	21 O/8-202
MP 86-118	21 O/8-203
MP 86-119	21 O/8-204
MP 86-120	21 O/8-205
MP 86-121	21 O/8-301
MP 86-122	21 O/8-302
MP 86-123	21 O/8-303
MP 86-124	21 O/8-304
MP 86-125	21 O/8-305
MP 86-126	21 O/8-401
MP 86-127	21 O/8-402
MP 86-128	21 O/8-403
MP 86-129	21 O/8-404
MP 86-130	21 O/8-405
MP 86-131	21 O/8-501
MP 86-132	21 O/8-502
MP 86-133	21 O/8-503
MP 86-134	21 O/8-504
MP 86-135	21 O/8-505
MP 86-136	21 P/5-101
MP 86-137	21 P/5-102
MP 86-138	21 P/5-103
MP 86-139	21 P/5-104
MP 86-140	21 P/5-105
MP 86-141	21 P/5-201
MP 86-142	21 P/5-202
MP 86-143	21 P/5-203
MP 86-144	21 P/5-204
MP 86-145	21 P/5-205
MP 86-146	21 P/5-301
MP 86-147	21 P/5-302
MP 86-148	21 P/5-303
MP 86-149	21 P/5-304
MP 86-150	21 P/5-305
MP 86-151	21 P/5-401
MP 86-152	21 P/5-402
MP 86-153	21 P/5-403
MP 86-154	21 P/5-404
MP 86-155	21 P/5-405
MP 86-156	21 P/5-501
MP 86-157	21 P/5-502
MP 86-158	21 P/5-503
MP 86-159	21 P/5-504
MP 86-160	21 P/5-505

Oil shale assessment of the Albert Formation in the Rosevale area (21 H/15W). D.F. Brown and K.D.A. Whaley. (1986). To accompany Open File Report 86-7.

MP 86-161	Geological compilation map of the Albert Formation in the Rosevale area. Scale: 1:10 000.
MP 86-162	Detailed geological map of the Rosevale oil shale area. Scale: 1:2500.

Lithologic logs. D.F. Brown. (1986). Scale: 1:100. To accompany Open File Report 86-7.

MP 86-163 Rosevale No. 1.
MP 86-164 Rosevale No. 2.
MP 86-165 Rosevale No. 3.
MP 86-166 Rosevale No. 4.
MP 86-167 Rosevale No. 5.
MP 86-168 Rosevale No. 6.

Geophysical logs. D.F. Brown. (1986). Scale: 1:200. To accompany Open File Report 86-7.

MP 86-169 Rosevale No. 1.
MP 86-170 Rosevale No. 2.
MP 86-171 Rosevale No. 3.
MP 86-172 Rosevale No. 4.
MP 86-173A Rosevale No. 5.
MP 86-173B Rosevale No. 5.
MP 86-174 Rosevale No. 6.

Organic geochemical logs. D.F. Brown. (1986). Scale: 1:200. To accompany Open File Report 86-7.

MP 86-175 Rosevale No. 1.
MP 86-176 Rosevale No. 2.
MP 86-177 Rosevale No. 3.
MP 86-178 Rosevale No. 4.
MP 86-179 Rosevale No. 5.
MP 86-180 Rosevale No. 6.

Geological cross sections of the Rosevale oil shale area. D.F. Brown and K.D.A. Whaley. (1986). Scale: 1:1000. To accompany Open File Report 86-7.

MP 86-181 Cross section A-B.
MP 86-182 Cross section C-D.
MP 86-183 Cross section E-F.
MP 86-184 Cross section G-H.
MP 86-185 Cross section I-J.
MP 86-186 Cross section K-L.

MP 86-187 Longitudinal section A'-B' of the Rosevale oil shale area. D.F. Brown and K.D.A. Whaley. (1986). Scale: 1:1000. To accompany Open File Report 86-7.

Regional stream sediment and water geochemical reconnaissance data, northern New Brunswick (parts of 21 O/9, 10, 11, 13, 14, 15, 16; 22 B/1, 2). Geological Survey of Canada. (1986). Scale: 1:100 000. To accompany G.S.C. Open File Report 1211.

MP 86-188 Sample location.
MP 86-189 Copper (ppm).
MP 86-190 Lead (ppm).
MP 86-191 Zinc (ppm).
MP 86-192 Manganese (ppm).
MP 86-193 Iron (%).
MP 86-194 Antimony (ppm).
MP 86-195 Tungsten (ppm).
MP 86-196 Molybdenum (ppm).
MP 86-197 Silver (ppm).
MP 86-198 Cobalt (ppm).
MP 86-199 Tin (ppm).
MP 86-200 Nickel (ppm).
MP 86-201 Arsenic (ppm).
MP 86-202 Uranium (ppm).

MP 86-203 Vanadium (ppm).
MP 86-204 Cadmium (ppm).
MP 86-205 Barium (ppm).
MP 86-206 Fluorine (ppm).
MP 86-207 Gold (ppb).
MP 86-208 Mercury (ppb).
MP 86-209 Uranium in water (ppb).
MP 86-210 Fluorine in water (ppb).
MP 86-211 pH in water.
MP 86-212 Loss on ignition %.

MP 86-213 Generalized geological map of southwestern New Brunswick (21 G). Compiled by H.H. Hassan. (1986). Scale: 1:250 000. To accompany Open File Report 86-10.

Airborne gamma ray spectrometric survey, Beadle Mountain, N.B. (21 J/11E, 10W). Geological Survey of Canada. (1986). Scale: 1:50 000.

MP 86-214A K %.
MP 86-214B Equivalent U/equivalent Th.
MP 86-214C (Equivalent Th/K)10^4.
MP 86-214D (Equivalent U/K)10^4.
MP 86-214E Equivalent Th ppm.
MP 86-214F Equivalent U ppm.
MP 86-214G Total count U.
MP 86-215A Profiles 20 to 25.
MP 86-215B Profiles 26 to 31.
MP 86-215C Profiles 32 to 37.
MP 86-215D Profiles 38 to 43.
MP 86-215E Profiles 44 to 49.
MP 86-215F Profiles 50 to 55.
MP 86-215G Profiles 56 to 60.

MP 86-216A Surficial geology of the Tetagouche Lakes area (21 O/9). A.G. Pronk. (1986). Scale: 1:50 000. To accompany Geological Notes Series P.M. 86-216.

MP 86-216B Gold in tills, Tetagouche Lakes area (21 O/9). A.G. Pronk. (1987). Scale: 1:50 000. To accompany Geological Notes Series P.M. 86-216.

Granular aggregate resource maps. (1986). Scale: 1:50 000.

MP 86-217 Cape Tormentine (11 L/4). A. Seaman.
MP 86-218 Hillsborough (21 H/15). A. Seaman, H. Lohse.
MP 86-219 Amherst (21 H/16). A. Seaman.
MP 86-220 Port Elgin (21 I/1). A. Seaman, H. Lohse.
MP 86-221 Moncton (21 I/2). A. Seaman, H. Lohse.
MP 86-222 Petitcodiac (21 H/14). R. Brinsmead, A. Seaman.
MP 86-223 Tabusintac River and Wishart Point (21 P/6,7). J. Thibault.
MP 86-224 Tracadie (21 P/10). J. Thibault.
MP 86-225 Burnsville (21 P/11). J. Thibault.
MP 86-226 Grande-Anse (21 P/14). J. Thibault.
MP 86-227 Caraquet (21 P/15). J. Thibault.
MP 86-228 New Brunswick Panhandle (21 N/2,3,6,7). J. Thibault.

MP 86-241 Geology of the Burnthill Granite (21 J/10). H.E. MacLellan. (1986). Scale: 1:20 000.

MP 86-242 Structural geology and lineaments, Cape Spencer, N.B. (21 H/4). G. Goucher. (1986). Scale: 1:50 000.

CHAPTER 2. MINERAL EXPLORATION IN NEW BRUNSWICK

METALLIC MINERALS[2, 3]

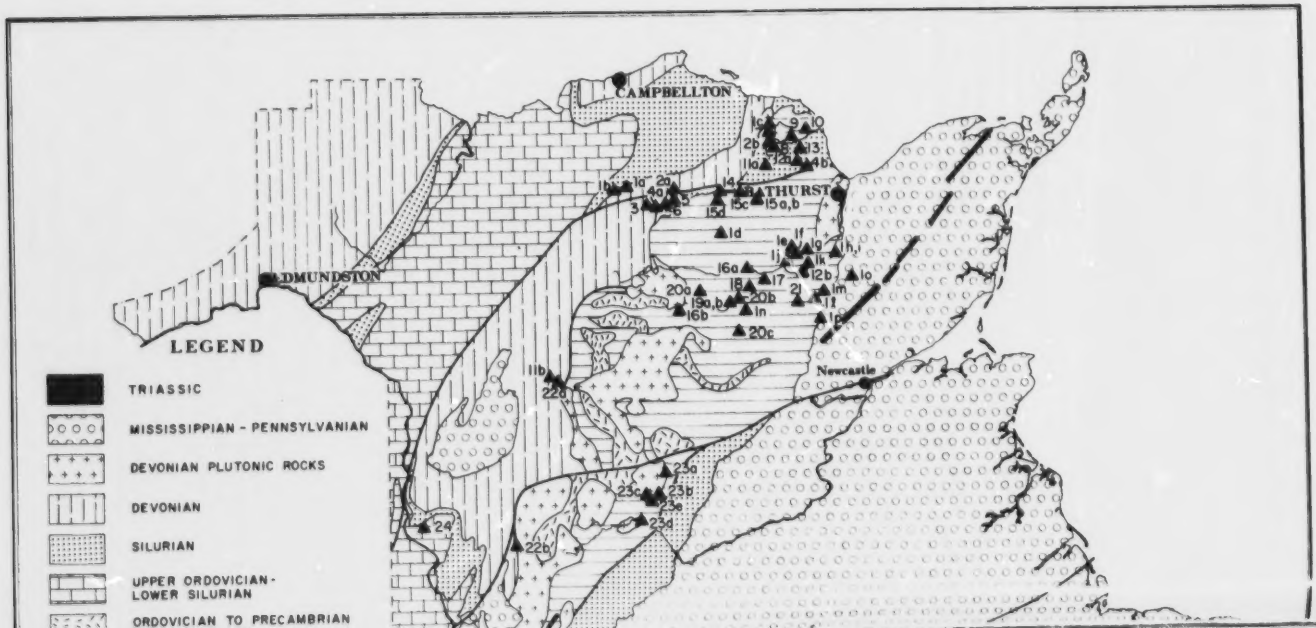
Gold was again the focus of exploration attention in 1986. A large proportion of the exploration was carried out by Lacana Mining Corporation and associated companies (Sparton Resources Inc., American Oakwood Energy Ltd., Lynx-Canada Explorations Limited, and Murphy Oil Company), Brunswick Mining and Smelting Corporation Ltd., Noranda Exploration Company Limited, and Granges Exploration Ltd. Other companies carrying out exploration include Falconbridge Limited, BP-Selco Resources, Esso Resources Canada Limited, Lac Minerals Ltd. and Rio Algom Exploration Inc. Several prospectors are active in the region, including Merton Stewart, Canadian "Prospector of the Year" who is a partner in a prospecting syndicate with Avard Hudgins. (Figure 17)

The important gold-bearing area in northern New Brunswick stetches from the Baie de Chaleur to the Upsalquitch River about 60 km west of Bathurst. The interesting area follows a series of faults that are believed to be geologically controlled. On the Upsalquitch end of the belt, six gold occurrences have been found, five by Brunswick Mining and Smelting Corporation Limited (Noranda) and one by Lacana Mining Corporation. All have been drilled and, although all the results are not available, it appears no economic amount of gold has been outlined so far.

The most notable gold deposit, the Lacana Alcida prospect, 21 km northwest of Bathurst, continues to show promise. The details of the deposit have not been announced by Lacana, but several drill holes put down in 1986-87 have outlined the configuration of the deposit. The dimensions of the deposit have not changed much from last year's figures but the deposit is now known to greater depths. The deposit is approximately 260 m long, up to 18 m wide and extends to well below 75 m. The gold content is variable but ranges from 3.1 to 4.8 g/t (0.09-0.14 oz./ton), with thinner, richer sections from 6.9 to 13.7 g/t (0.2-0.4 oz./ton). The prospect is on the private land of about 12 landowners. However, the entire claim group involves 60 landowners. Lacana Mining Corporation pays the landowners for drill holes, trenches and picketlines on their properties. Last year the company reported that increasing demands of some landowners might force the company to follow the Mining Act in such matters (claims for damages). No such action has yet been taken.

Lacana Mining Corporation has also reported an interesting silver prospect northwest of California Lake, approximately 40 km southwest of Bathurst. Two articles in the Northern Miner reported several drill-hole sections with silver content ranging from 1851 g/t (54 oz./ton) over 0.3 m to 446 g/t (13 oz./ton) over 4.6 m.

In other exploration activities, BP Resources Canada Limited staked several claims to investigate the platinum potential of some favourable rocks near Portage Lakes, 64 km west of Bathurst. Granges Exploration Ltd. also carried out an exploration programme on a known nickel-copper prospect (Maliseet Mountain) to investigate the possibility of platinum.


CAMPBELLTON
EDMUNDSTON
BATHURST
Newcastle
LEGEND
TRIASSIC
MISSISSIPPIAN - PENNSYLVANIAN
DEVONIAN PLUTONIC ROCKS
DEVONIAN
SILURIAN
UPPER ORDOVICIAN - LOWER SILURIAN
ORDOVICIAN TO PRECAMBRIAN

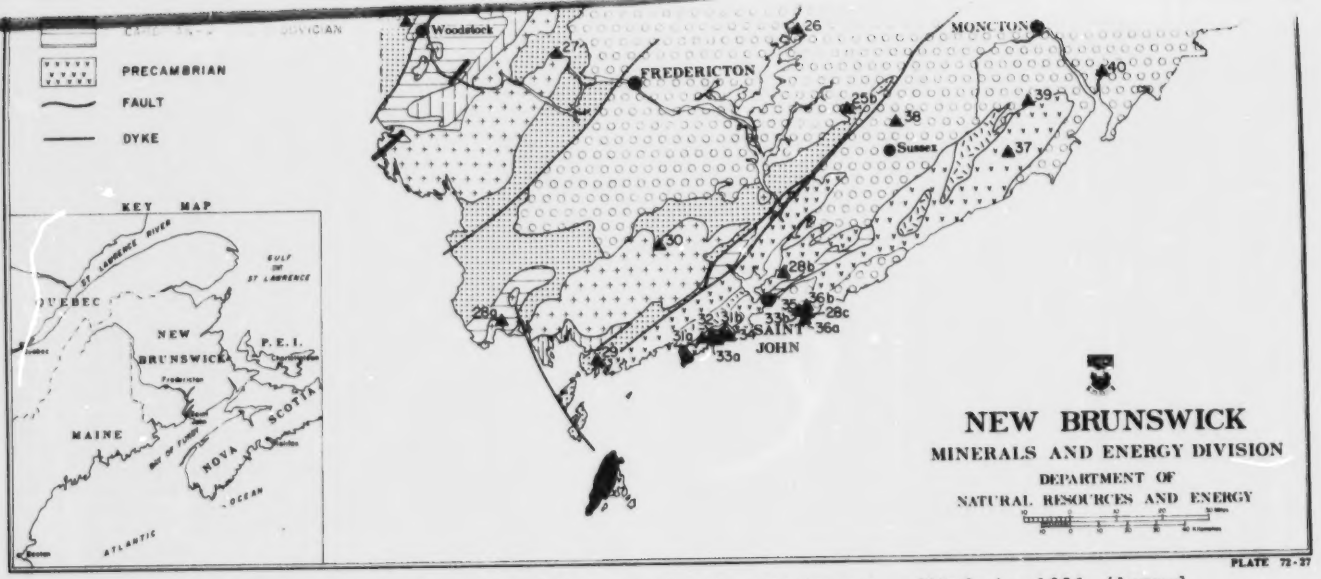


Figure 17. Location of properties for which assessment reports were filed in 1986 (legend continued on next page).

Companies and Individuals Exploring Properties in 1986
(to accompany Figure 17)

1. Brunswick Mining and Smelting Corporation Limited
2. Esso Resources Canada Ltd.
3. Wayne Carroll
4. Michael Smith
5. Ds Oro Resources Inc.
6. R. Stairs
7. D. Black
8. T. Lodge
9. J.C. Pitre
10. M. Watson
11. Lacana Mining Corporation
12. Norman Pitre
13. C.A. Willett
14. Lac Minerals Limited
15. Anaconda Canada Exploration Ltd.
16. Granges Exploration Ltd.
17. John Duffy
18. Cominco Ltd.
19. K.D.A. Whaley
20. Noranda Exploration Company Limited
21. Bryan Wilson
22. BP Resources Canada Limited
23. Kidd Creek Mines Ltd.
24. Upper Kent Lime Works Ltd.
25. Maritime Resources Research Ltd.
26. N.B. Coal Limited
27. Shediac Bay Resources Ltd.
28. Morton Gordon
29. Mascarene Mines Ltd.
30. J.A.R. McIntyre and P. Fenety
31. Rex Silver Mines Ltd.
32. Kinbauri Gold Corp.
33. P. Fenety
34. Newbrun Resources Ltd.
35. Wayne Hunter
36. H.C. McNamara
37. Tournigan Mining Exploration Ltd.
38. J. Colucci
39. J.A.R. McIntyre
40. J.A. Leslie

Early in 1987, Seabright Resouces Inc. staked several claims in the Alcida-Upsalquitch gold belt, and will be exploring them in the summer of 1987.

The Lincoln Resources Inc. option on the Restigouche zinc-lead-silver-copper deposit, negotiated with Placer Development Limited last year, has been terminated. Later in 1986, Placer Development Limited announced an agreement with Southwind Resource Exploration Limited on the same deposit.

Brunswick Mining and Smelting Corporation Limited acquired more interest in Heath Steele Mines Limited and proceeded with exploration programmes on the Heath Steele lease. They also obtained the so-called Stratmat sulphide deposit from Cominco Ltd. A drilling programme was carried out on the Stratmat west and Heath Steele boundary zone sulphide deposits, primarily to obtain metallurgical samples. Unofficial results indicate excellent recoveries of base-metal sulphides.

Brunswick Mining and Smelting Corporation Limited also obtained an option on the Halfmile Lakes zinc-lead-silver-copper sulphide deposit from Falconbridge Limited and completed a flow-through-share drilling programme. Canacord Resources Inc. is reported to have put up $300 000.

The Chester zinc-lead-copper sulphide deposit, formerly owned by Chester Mines (Sullico Ltd.) has been staked by Brunswick Mining and Smelting Corporation Limited and Granges Exploration Ltd. Chester Mines allowed its Mining Licence to lapse in March 1987.

Lac Minerals Limited continued its gold-silver exploration programme in the Annidale area.

Gordex Minerals Ltd. successfully completed its heap leaching test at Cape Spencer. The company conducted an extensive diamond drilling program to fully delineate its ore body. The most recent published reserves are 907 184 t grading 1.95 g/t (0.057 oz./ton) gold.

Gordex Minerals Ltd. conducted a magnetic survey on its St. Stephen copper-nickel-platinum prospect. The highest platinum assay reported was 1310 ppb.

Mispec Resources Inc. delineated a gold-bearing zone extending from the Gordex property to Millican Lake. Extensive trenching was carried out and about 80 short holes were drilled. Drilling was guided by an induced polarization survey. The gold ore delineated by the company is similar to that found at Cape Spencer.

Durham Resources Inc., conducted an extensive underground exploration programme to increase its ore reserves. Present geologic reserves are estimated to be 678 145 t grading 4.03% Sb at 2% cutoff. Mineable reserves are 491 366 t grading 3.40% Sb. The mine area also has potential for gold ore, which was intersected in several drill holes. Durham also staked a copper-nickel-bearing zone east of St. Stephen, which has potential for platinum-group minerals.

Shediac Bay Resources Inc. conducted an exploration programme for beryllium oxide and rare earth elements at Zealand Station. A preliminary estimate suggests possible reserves of 147 000 t grading 0.74% BeO.

Rex Silver Mines Ltd. continued exploration for gold in the Bay of Fundy coastal zone, southwest of Saint John. A diamond drilling programme was initiated to test the porphyry-copper-gold occurrences in the Musquash Harbour area.

Kinbauri Gold Corp. delineated a highly anomalous gold zone in humus overlying Precambrian granitic rocks that are thrust over Carboniferous clastic sedimentary rocks in the Chance Harbour area.

U.S. Borax Inc. drilled several holes in the old Vernon Mine copper-gold prospect, east of Martin Head, along the Bay of Fundy coast. Earlier reports mentioned ore-grade gold assays from this area.

Dr. Winfred Brack, Peter Fenety, Wayne Hunter, J. Roy McIntyre, and William Walton prospected gold-bearing rocks along the southwestern extension of the Pendar Brook Fault zone in the Hoyt area. The southwestern extension of the structure was delineated as a result of a detailed investigation of the eastern Saint George Batholith and its contact aureole. McIntyre and Fenety reported assays from grab samples ranging from 1.0 to 9.6 g/t (0.03-0.28 oz./ton) gold. The best assays reported by Brack are two grab samples assaying 12.7 g/t (0.37 oz./ton) gold. Stratabound Minerals Corp. optioned the McIntyre-Fenety prospect and is planning a trenching and diamond drilling programme.

Morton Gordon continued exploring a graphite prospect in Precambrian metasediments in the Golden Grove area east of Saint John. The high-grade zone contains 35-40% graphite ranging in size from 75 to 300 microns.

Claims were staked over the prominent gypsum deposits in the Hillsborough and Sussex areas. Plans for construction of a gypsum-board plant in southern New Brunswick are being made.

EDITOR'S NOTE: The first name (company or individual) given for each assessment report is that of the holder of the mining rights. Since the author of the report may not be the holder of the rights, please consult the Geoscan index for cross-reference information.

MATAPEDIA-AROOSTOOK ZONE

24. **Upper Kent Lime Works Ltd.**

Upper Kent Property, M.L. 1326 (473308) 21 J/12E

This agricultural lime operation near Maplehurst operated from May to November of 1985.

25. **Maritime Resources Research Ltd.**

(a) Woodstock Manganese Claim Gp. (473168) 21 J/4E

The three blocks totalling 57 claims are located approximately 6 km west of Woodstock.

Linecutting and a geological survey were completed. The diamond-drill hole was abandoned at 109 m, before the mineralized zone was penetrated. The Plymouth orebody underlies the southwestern corner of the claim group.

Estimated reserves are 181 000 000 t of manganese ore averaging 9% Mn and 13% Fe.

TOBIQUE-CHALEUR ZONE

1. **Brunswick Mining and Smelting Corporation Limited**

(a) Southeast Falls Claim Gp. (473326) 21 O/10E

This group of 18 claims is located on the Southeast Upsalquitch River, 5 km upstream from Upsalquitch Forks. It surrounds a group of four claims held by other interests. The geology is similar to that of the Upsalquitch Forks claim group (Silurian, shallow-water, marine sedimentary rocks overlain by bimodal volcanic rocks). Diorite dykes occur locally.

Amoco and Rio Canex had previously reported silver anomalies near Caribou Brook, which drains the area; however, no silver anomalies were detected in the 118 silt/soil/seep samples or the 23 rock samples collected. No gold anomalies were detected in any sample media. Weak arsenic anomalies (25-71 ppm) were detected. A zone of brecciated, altered, fuchsite-bearing rhyolite was noted near the mouth of Caribou Brook.

(b) Upsalquitch Forks Claim Gp. (473325) 21 O/10E

This group of 16 claims is located 5 km southwest of Upsalquitch Forks near Three Mile Pool on the Northwest Upsalquitch River. A lead-zinc-silver skarn showing along the river near Three Mile Pool has been examined sporadically since 1955. The geology consists of Silurian, shallow-water, marine, sedimentary rocks overlain by bimodal volcanic rocks that are predominantly subaerial. Minor intrusions of aplite and diorite are present. The skarn zone occurs at the contact between calcareous sedimentary and rhyolitic volcanic rocks. Sedimentary structures indicate tops to the south.

Mineralization consists of sphalerite and galena along fractures within the skarn zone. Silver assays previously reported to 274 g/t (8 oz./ton) could not be repeated. Total sulphide content in the skarn is less than 5%.

The property and surrounding area was prospected, and 183 soil/seep/silt/heavy-metal-concentrate and 106 rock samples were taken. The skarn zone was traced over a length of 3 km, but no precious metal mineralization was found.

2. **Esso Resources Canada Ltd.**

(a) Meadow Lakes Claim Gp. (473298) 21 O/9W

This group of 24 claims is located 55 km west of Bathurst in the vicinity of Tongue Lake. The property is underlain by Chaleurs Group sedimentary rocks and Dalhousie Group mafic volcanic rocks that are in faulted contact (Rocky Brook-Millstream Main Break) and is a favourable target for gold occurrences similar to the Simpson's Field and Dalhousie Road showings. Little previous exploration is known from this area.

The 1986 programme entailed prospecting, soil sampling and a VLF EM survey over the entire claim group. The VLF EM survey outlined very weak conductive zones and soil sampling detected sporadic arsenic (to 159 ppm), silver (to 3.4 ppm), and a single gold anomaly (295 ppb). This gold anomaly could not be repeated by sampling and samples of calcareous grey siltstone from the same area were not mineralized. A sample of altered diabase from the south shore of Meadow Lakes carried 95 ppb Au. Additional geochemical data must be evaluated before assessing the property.

3. **Wayne Carroll**

McCormack Brook Claim Gp. (473284) 21 O/10E

Two claims cover an old shaft (15 m deep) near the mouth of McCormack Brook. The claims are underlain by Silurian, shallow-water, marine, sedimentary rocks. A major fault passes through the northern portion of the property. Two trenches were excavated and sampled as was the shaft. Geochemically anomalous gold was detected in both trenches (up to 440 ppb Au) and the best assays returned from the shaft samples were 0.23% Cu, 0.02% Pb, 0.01% Zn, 0.206 g/t (0.006 oz./t) Au and 4.46 g/t (0.13 oz./ton) Ag. Mineralization reportedly occurs in silicified zones.

4. Michael Smith

(a) Smith Option (473258) 21 O/9W

This group of 30 claims is located approximately 2 km west of the junction of McCormack Brook with Southeast Upsalquitch River.

Work on the property consisted of linecutting, geological mapping, soil sampling, and VLF and magnetometer surveys on the cut grid. The soil geochemical survey indicated a moderate to strong zone of lead, zinc, arsenic, and copper in the area overlying the Murray Brook Fault zone.

5. Ds Oro Resources Inc.

Fulton Lake Claim Gp. (473297) 21 O/9W

This group of 21 claims is located 55 km west of Bathurst near Island Lake and is underlain by Chaleurs Group sedimentary rocks similar to those that occur at the Simpson's Field gold showing. Mafic intrusions are of Devonian age.

An exploration programme consisting of soil sampling, VLF EM and magnetometer surveys, and prospecting was carried out over the entire claim group. A test study of soil samples taken over the Alcida gold discovery indicated that the -80 mesh fraction of the B-horizon gave the best indication of bedrock mineralization. Several clusters of 10-15 ppb Au were detected with two spot highs of 90 and 350 ppb. Very weak VLF EM conductive zones were outlined and the magnetic response was relatively flat, although a weak +400 gamma feature with a flanking low similar to the Alcida gabbro response was outlined. Prospecting failed to uncover mineralized material at the anomalous gold sites or in relation to the geophysical anomalies. No further work is recommended.

6. R. Stairs

Murray Brook Gold Claim Gp. (473312) 21 O/9W

This group of 25 claims is located in the Upsalquitch Forks area in proximity to the Simpson's Field gold discovery, 60 km west of Bathurst. An exploration programme was undertaken by U.S. Borax Inc. after obtaining a 3935 ppb Au analysis from a silt sample near the western boundary of the property.

The claim group is underlain by Silurian Chaleurs Group sedimentary rocks (predominantly grey and calcareous siltstones) and Devonian dioritic intrusions. Ten samples of altered (red-brown) siltstone were assayed for copper, lead, zinc, gold, silver, and arsenic.

One sample contained 69 ppb Au; weak base-metal values were encountered in most samples. Silt samples indicated areas of weak lead, zinc, ±arsenic anomalies, but no gold anomalies were found. Soil samples (128) were analyzed for copper, lead, zinc, gold, silver and arsenic. Results indicate weak lead-

zinc haloes coincident with altered red-brown calcareous siltstone. Only two samples were auriferous (41 and 110 ppb Au).

11. **Lacana Mining Corporation**

(b) Shingle Gulch Claim Gp. (473295) 21 O/3E

This group of 40 claims is located 33 km northeast of Plaster Rock and is accessible via the Fraser Company haulage road near Long Lake. The property is underlain by Devonian volcanic and sedimentary rocks (flow-banded rhyolite, amygdaloidal basalt and shaley siltstone) with some mafic intrusions. Exploration has been intermittent since 1955 and no significant mineralization was known prior to the discovery of massive sulphides in a road exposure in 1984. Limited exploration of this discovery by Lacana did not locate its source.

The 1986 programme consisted of linecutting, VLF EM, magnetometer and soil sampling surveys. The surveys extended for 1 km north and south of the gossanous float. Assays of this material ran up to 1.5% Cu, 0.84% Pb, 0.71% Zn and 68 g/t (2.0 oz./ton) Ag. The VLF EM survey outlined a strong VLF conductor south of the float that is open along strike, as well as other stratabound conductors of moderate intensity. The magnetic response is flat (the sulphides are not magnetic at the showing).

Further exploration will be directed by geochemical results in conjunction with VLF EM trends.

22. **BP Resources Canada Limited**

(a) Shingle Gulch Claim Gp. (473265) 21 O/2W
21 O/3E

This group of 37 claim is located 35 km northeast of Plaster Rock and is accessible via gravel road from the Long Lake haulage road. Strong lead and zinc anomalies in stream sediments have been known from the area since 1968; however, only low-grade concentrations (less than 2500 ppm combined) of lead and zinc along a sedimentary-volcanic rock contact. Prospecting by BP personnel in 1984 located a rhyolite boulder carrying similar concentrations of lead and zinc.

The property is underlain by Devonian siltstone, rhyolite (massive to flow-banded), and amygdaloidal basalt.

BP prospected and conducted soil and silt sampling surveys over the property to further evaluate the potential of the mineralized volcanic rocks. Two anomalies were outlined in soils, but no bedrock sources were identified. Rock samples (mainly float) of pyritic rhyolite were found to contain consistently elevated levels of base metals but are not of economic interest. The soil and silt anomalies are believed to be associated with widespread, low-grade, base-metal mineralization in the volcanic rocks.

ELMTREE ZONE

1. **Brunswick Mining and Smelting Corporation Limited**

(c) Belledune Pond Claim Gp. (473261) 21 P/13W
21 O/16E

The Belledune Pond claims cover a zinc-lead sulphide skarn occurrence discovered in the late 1960s.

The 1985 exploration programme comprised soil geochemical, VLF EM, and magnetometer surveys. The area is underlain by intercalated metaturbidites and mafic volcanic rocks of the Elmtree Group. The supracrustal rocks have been intruded by Devonian gabbro and granite, with extensive skarn developed near the latter. The mineralization consists of disseminated and banded sphalerite, galena and minor pyrite associated with the chloritic skarn facies. Grab samples assayed up to 5.4% Zn, 4.50% Pb, and 46.28 g/t (1.35 oz./ton) Ag. Copper and gold content was very low. Three holes were drilled to test coincident VLF EM, HEM, and magnetic anomalies. The results indicated that the zinc-lead-silver mineralization occurs at a contact between calc-silicate skarn and unaltered, impure limestone. The best intersections are as follow:

Hole No.	Interval (m)	Width (m)	Pb (%)	Zn (%)	Ag (g/t)
4B11-85-1	64.86- 65.14	0.28	3.1	1.26	85.7
4B11-85-3	112.72-113.81	1.09	6.75	10.00	33.6

4. **Michael Smith**

(b) Millstream River Claim Gp. (473291) 21 P/12W

This group of 20 claims is located 13 km northwest of Bathurst and is adjacent to Mining Lease 239 (former producer, Nigadoo mine). The property is underlain by Chaleurs Group sedimentary rocks, and the Rocky Brook-Millstream fault lies some 300 m south of the claim group. Mineralized boulders cut by quartz-arsenopyrite veins were discovered and returned assays of up to 6.10 g/t (0.178 oz./ton) Au and 40.11 g/t (1.17 oz./ton) Ag. Similar mineralization is known from the Stephens Brook occurrence.

A VLF EM survey established a strong conductor more than 350 m in strike length. It trends northeast in the vicinity of one boulder cluster and is apparently associated with similar trends at three other localities. The main conductor is believed to be caused by sulphide-rich veins. A limited number of soil samples were taken (37 in total) in the vicinity of the main conductor. High silver (1-8 ppm) and sporadic base metal (Cu to 128 ppm, Pb to 168 ppm, and Zn to 400 ppm) and arsenic (to 270 ppm) contents were detected. No anomalous gold was found.

The property is under option to Atlantic Orebodies Inc. who recommends extensive linecutting, MaxMin and soil surveys, and 600 m of drilling.

7. **D. Black**

Antinouri Lake Area Claim Gp. (473292) — 21 P/13W

This group of 14 claims is located 3 km north of Antinouri Lake and is easily accessible via the Mitchell Settlement Road. The property is underlain by Elmtree Group sedimentary rocks that have been intruded by Devonian gabbro and granite with localized development of skarn.

The property was surveyed in part by a "Beep mat" EM unit that detected a number of conductors (weakly mineralized gabbro) along a well-cut trail. Disseminated pyrrhotite and pyrite were noted in outcroppings and boulders, six of which were blasted for sampling but did not return significant assays (copper, nickel, gold, silver).

2. **Esso Resources Canada Ltd**

(b) Antinouri Lake Claim Gp. (473294) — 21 P/13W, 21 O/16E

This group of 84 claims is located 30 km northwest of Bathurst and is accessible via a dirt road from the village of Alcida, which transects the eastern portion of the property just west of Antinouri Lake. It is underlain by Devonian gabbro and Ordovician sedimentary rocks of the Elmtree Group, and is transected by east-west-trending faults (a geological environment similar to that of the Alcida gold discoveries).

The eastern half of the group was soil sampled (528 samples) and surveyed by VLF EM; the western half was surveyed only by VLF EM due to frozen ground conditions. The soil samples were analyzed for gold, silver, and arsenic.

No significant gold anomalies were detected (sporadic 5-35 ppb values were obtained), and silver values were low; however, arsenic trends are evident in the southeastern portion of the property (up to 1200 ppm). East-west-trending conductive zones are evident from the VLF EM data, but very limited coverage is provided over the geochemically anomalous area. Surveys were conducted along paced claim and half-claim lines only. The area was prospected and only weak pyrrhotite-pyrite mineralization was seen in hornfels and, in one instance, in quartz-pebble conglomerate. Numerous occurrences of diabase were noted. Resampling of areas with arsenic highs in soils could duplicate the original results.

Further soil sampling and VLF EM surveying is recommended.

8. **T. Lodge**

Antinouri Lake Claim Gp. (473331) — 21 P/13W, 21 O/16E

Four Seasons Resources Ltd. optioned this group of 24 claims located 30 km northwest of Bathurst, just south of Antinouri Lake. The property is underlain by Ordovician

Elmtree Group sedimentary rocks (similar to those that host the West Gabbro Gold Zone of Lacana Mining Corp.) and by Devonian gabbro. Exploration consisted of soil geochemical, magnetometer and VLF EM surveys.

The soils were analyzed for gold plus a 27-element ICP package that included silver, antimony, gold, barium, molybdenum, palladium and platinum. A total of 1084 samples were collected. Weak arsenic (to 605 ppm) and antimony (to 24 ppm) anomalies were detected, but no significant gold anomalies were detected. The magnetometer survey suggests the presence of mafic intrusions to the west, and a moderate magnetic high in the centre of the property remains unexplained. The VLF EM survey outlined a number of east-west-trending conductors, some of which correspond to weak soil anomalies.

9. J.C. Pitre

Boulay Pond Claim Gp. (473299) 21 P/13W

This group of 9 claims is located 35 km northwest of Bathurst, and 4 km north of the Alcida gold discovery. The property is underlain by the Nicholas Dénys Granodiorite and sedimentary rocks of the Elmtree Group. The ground was staked to cover a weak arsenic anomaly detected during the 1965 Geological Survey of Canada stream sediment survey in the Bathurst area. Anomalous arsenic in silts led to the discovery of gold near Alcida.

Little work has been reported from this area and during the winter of 1986, VLF EM, magnetometer and soil surveys were conducted. The magnetic response was relatively flat; however, a number of east-west-trending conductors were outlined. Reconnaissance soil sampling above the conductor axes suggests anomalous arsenic (50-159 ppm) in the southern portion of the property.

A minor pyrite occurrence was sampled along the Elmtree River but no anomalous gold was detected. The area of anomalous arsenic in soils is recommended for follow-up work.

10. M. Watson

Madran Claim Gp. (473324) 21 P/13W

This claim group is located 22 km north of Bathurst, between the villages of Petit Rocher and Pointe Verte. Highway 11 transects the property. The property is underlain by Silurian and Ordovician sedimentary rocks similar to those found at the Alcida gold discovery, which is situated 7 km along strike to the west.

An airborne VLF EM and magnetometer survey was carried out over the entire claim group in 1986. Several weak VLF EM conductors were outlined parallel to the Silurian/Ordovician contact, probably reflecting the faulted nature of the contact. Weak positive magnetic anomalies associated with this contact suggest the presence of mafic intrusions. Altered gabbro is an important host to gold mineralization at Alcida.

11. **Lacana Mining Corporation**

(a) South Nigadoo Claim Gp. (473293) 21 P/12W

This group of four claims is located 25 km northwest of Bathurst and 5 km west of Nigadoo Lake. The property is underlain by Chaleurs Group sandstone, siltstone and conglomerate, which have been intruded by Devonian gabbro. The claims were staked over a mineralized quartz vein discovered on the south bank of the South Nigadoo River. The vein material assayed 4.90 g/t (0.143 oz./ton) Au. No previous exploraton is known from the area.

The property was mapped and surveyed by VLF EM and magnetometer in conjunction with a soil sampling survey. Geochemical data is pending. Mapping has delineated east-west-trending beds of siltstone and conglomerate and gabbro/diorite intrusions. The gold mineralization occurs in a 0.5 m thick quartz vein that carries disseminated arsenopyrite. Iron carbonate alteration is apparent over a 6 m wide zone on either side of the vein. Magnetic data suggest the presence of a mafic intrusion just north of the occurrence. The VLF EM survey outlined four distinct conductors, one of which has a northeast trend and may be related to structural features.

The showing will be sampled in detail and further exploration will be guided primarily by soil geochemical results.

12. **Norman Pitre**

(a) Free Grant Claim Gp. (473323) 21 P/12W

This block of 32 claims is located 15 km northwest of Bathurst near the village of Nicholas Dénys and north of the Millstream River.

A reconnaissance "Beep mat" EM survey was conducted over the claim group, which is underlain by the Nicholas Dénys Granodiorite and contact metamorphosed siltstones of the Chaleurs Group. Only boulders of the granodiorite were found and very few outcrops of sedimentary rocks. No conductive or mineralized areas were detected with the "Beep Mat".

13. **C.A. Willett**

Dauversière Claim Gp. (473303) 21 P/13W

This group of 24 claims is situated 24 km northwest of Bathurst near the village of Alcida. The property ties on to the south boundary of Lacana Mining Corporation's Elmtree (Alcida) gold property, and is underlain by Chaleurs Group sedimentary rocks.

A reconnaissance soil sampling survey was conducted along claim lines at 30 m sample intervals and analyses were made for gold and arsenic. A quartz-rich boulder in the area is reported to have assayed 6.86 g/t (0.2 oz./ton) Au. Three

anomalous gold sites were detected (20-30 ppb) and arsenic values to 155 ppm were noted. A VLF EM survey and prospecting are recommended.

MIRAMICHI ZONE

1. **Brunswick Mining and Smelting Corporation Limited**

(d) Indian Lake Property, M.L. 1374 (473267) 21 O/8E

This Mining Licence adjoins the north boundary of M.L. 1340, which covers the Strachens Lake brook sulphide deposit. The area is underlain by a variety of felsic pyroclastic rocks with intercalated mafic volcanic and sedimentary rocks. The Strachens Lake brook sulphide deposit is hosted by fine-grained waterlain(?) felsic tuff.

In 1985 the exploration programme, comprising linecutting, magnetometer, and MaxMin II electromagnetic surveys, was able to trace the "favourable horizon" under the claims.

(e) Reids Brook Claim Gp.
Project 4373 (473269) 21 P/5W

The property comprises 16 claims that lie between Pabineau River and Nine Mile Brook, 30 km southwest of Bathurst. The claims were staked originally to cover an airborne electromagnetic conductor outlined in 1975.

The claims appear to straddle a contact between felsic pyroclastic rocks and graphitic argillite. The 1986 exploration work consisted of a soil geochemical survey and a cursory geological examination. The soil results indicated copper, lead, zinc, and silver anomalies coincident with magnetic anomalies. Further work is recommended.

(f) Tower Property, M.L. 1386
Project 4373 (473270) 21 P/5W

This property (28 claims) adjoins M.L. 1386, which includes the Flat Landing Brook sulphide deposit.

Work reported in 1986 consisted of detailed geological mapping and soil sampling. The property straddles the contact between felsic volcanic rocks and graphitic argillites. This is considered to be favourable exploration terrane. A drill hole (C73-1-85) was put down to test coincident HEM, magnetometer and soil geochemical anomalies. The 284 m hole intersected mainly graphitic argillite; however, the last 61 m indicated increasing amounts of felsic ash. No significant mineralization was encountered. Trenching and more drilling is recommended.

(g) "FAB" Claim Gp., Project 218 (473330) 21 P/5W

The "FAB" group consists of 43 claims located 23 km southwest of Bathurst, and 6 km from the No. 12 mine. The property is transected by the Mines Road. Since 1983, Brunswick has surveyed the property by magnetometer, gravity, MaxMin II EM and VLF EM. Geologic mapping and diamond drilling have also been conducted.

In 1985-86 a Pulse EM survey was conducted down a 1977 drill hole, and 2 holes were drilled. Drilling was targeted on a Pulse EM conductor beneath the 1977 drill hole. Weak sulphide mineralization was intersected within Tetagouche Group argillaceous sediments from 346 to 369 m in hole 218-8, which was drilled to a depth of 434 m. Hole 218-9 intersected similar mineralization from 311 to 331 m. The total depth was 401 m. This hole was 122 m along strike from hole 218-8. Thin beds, 7.6-12.7 cm, of massive pyrrhotite were intersected in both drill holes and are believed to account for the targeted Pulse EM anomaly. No significant base-metal concentrations were present although the sediments were correlated with the Brunswick horizon. The two holes will be surveyed by Pulse EM at a future date.

(h) Gordon Meadow Brook Property, M.L. 1359 (473321) 21 P/5E

This Mining Licence is located 24 km south of Bathurst near the Key Anacon mine and is accessible via Highway 360. A hole drilled in 1985 intersected 1.5 m of iron formation yielding 2.7 g/t (0.08 oz./ton) Au. Work in 1986 consisted of drilling three holes to test the lateral extent of this mineralization. The property is underlain by Carboniferous sediments up to 61 m in thickness, which unconformably overlie Tetagouche Group volcanic and sedimentary rocks.

The previously intersected gold mineralization occurred in iron formation overlying a basic volcanic unit, interpreted to represent the footwall side of a southward plunging, westward dipping anticlinal fold. The favourable iron formation was intersected in only one of the three holes drilled in 1986 at the same stratigraphic horizon. Pyritic sediments were intersected above the basic volcanic unit in the other two holes. No gold mineralization recurred in any of these horizons.

(i) West Cold Branch Claim Gp., Project 228 (473263) 21 P/5E

This group of 19 claims is located 20 km south of Bathurst along Route 360, and within 2 km of the Key Anacon mine shaft. Much of the property is underlain by Carboniferous sedimentary rocks that unconformably overlie Tetagouche Group rocks. Previous exploration by Brunswick included line-cutting, magnetometer and EM surveys.

In 1985, a gravity survey was conducted over the entire property. No significant anomalies were delineated. A

diamond-drill hole was targeted on a previously detected coincident EM and magnetometer anomaly with an uncertain gravity response. The hole intersected magnetic, basic volcanic rocks at a depth of 223 m, which accounts for the geophysical anomalies. No significant sulphide mineralization was cored and the hole was stopped at a depth of 318 m. The presence of a major isoclinal fold structure in the area was supported by the presence of graded bedding in sedimentary rocks enclosing the mafic volcanic unit. No further work is recommended.

(j) Reid's Brook Claim Gp., Project 4373 (473311) 21 P/5W

The Reid's Brook claim group (28 claims) is part of the Tower Group project that includes M.L. 1386. The group is located 35 km southwest of Bathurst, west of the No. 12 and No. 6 mines.

Previous work had outlined anomalous copper, lead, zinc and silver in soils over a 6.5 line km grid and this grid was surveyed with magnetometer, VLF EM and MaxMin II EM units. Four trenches were excavated to determine the source of favourable anomalies and revealed weak (2-5%) pyrite mineralization in felsic tuffs and moderately magnetic mafic tuffs. It was felt that the trenches did not adequately account for the geochemical anomalies (all assays were less than 100 ppm Cu, 70 ppm Pb, 125 ppm Zn, and 0.2 ppm Ag). A 125 m drill hole is proposed to test a MaxMin anomaly.

(k) No. 6 Southwest Property, M.L. 1282 Project 104 (473322) 21 P/5W

This Mining Licence is situated 30 km southwest of Bathurst along the south and west boundaries of the No. 6 Crown grant. The 1986 programme entailed down-hole Pulse EM surveys of three diamond-drill holes.

Drilling in 1976 and 1980 had intersected chloritic iron formation with high concentrations of sulphides (up to 1 m in thickness). Of the six drill holes targeted for the Pulse EM survey, three were caved (104-1, 104-2 and 104-6). The remaining holes could not be surveyed over their entire lengths due to flattening and this prohibited surveying at depth in 104-4 where 1 m of 90% pyrite-pyrrhotite had been intersected (the probe was stuck almost 100 m above the sulphide zone). Weak conductors were detected between 104-3 and 104-5, but were not of economic interest. No further work is planned.

(l) Portage River Claim Gp., Project 223 (473317) 21 P/5W

This large block of 175 claims is located 48 km southwest of Bathurst and 6 km east of the Captain deposit. Following a comprehensive programme of geological mapping, horizontal-loop EM, gravity and magnetometer surveying, and overburden profile drilling, five holes were drilled and a limited down-hole EM survey was completed on two holes.

Drilling results were discouraging; however, the various geophysical anomalies were adequately explained by the presence of graphitic sediments, disseminated pyrite zones and contrasting rock densities. Hole 223-5 tested a pyrite zone mapped from outcrops and intersected 2 m of disseminated and massive pyrite in rhyolite (grades are reportedly insignificant). Hole 223-4 further tested this zone along strike and intersected weaker and similarly uneconomic sulphide mineralization. Hole 223-2 intersected 6 m of massive quartz with minor arsenopyrite, but no anomalous gold assays were obtained. The down-hole EM survey conducted in holes 223-4 and 223-5 did not suggest the presence of massive sulphide off-hole anomalies. These claims have been allowed to lapse.

(m) McKay Brook Claim Gp., Project 235 (473264) 21 P/05E

The McKay Brook property consists of 42 claims located 35 km south of Bathurst and 13 km southeast of the No. 6 mine. The ground was staked to investigate potential silica sources for Brunswick's smelter after numerous boulders of quartz-rich sandstone were noted along a logging road. Silica is presently obtained for this purpose from a sandstone quarry in East Bathurst. The property is entirely underlain by flat-lying Carboniferous sedimentary rocks that rest unconformably on Tetagouche Group rocks.

Prospecting led to the discovery of several quartz-rich (Carboniferous) sandstone boulders that assayed up to 98.55% SiO_2 and averaged 96.63% SiO_2 (14 samples). Only two outcrops were found on the claim group. Four short holes were drilled in the vicinity of the boulders to test for the presence of near-surface quartz-rich beds. Drilling indicated only one suitable bed (92.20% SiO_2), which averaged 1.1 m in thickness. The unconformity was intersected in each drill hole and the Ordovician rocks were found to be argillites and quartzites. While it is felt that a silica deposit of economic grade may exist on the property, the exploration costs are considered prohibitive at this time due to the excessive overburden thickness.

(n) Satellite Claim Gp. (473283) 21 O/8E
21 O/1E

This area, covered by 51 claims, has been explored sporadically for 30 years. The features of interest are disseminated sulphide occurrences that lie within the so-called "favourable horizon" 7 km southwest of the Heath Steele mine.

The work reported in 1986 consisted of magnetometer, EM-16, soil geochemical, induced polarization, and Mise à la Masse surveys. Four drill holes (949.3 m) were put down to test the targets outlined. The holes cut a series of banded felsic tuffs, crystal tuff, chloritic metasediments, and chloritic iron formation. Pyritic mineralization was encountered, but the significant assays were obtained only in drill holes 85-1 and 85-3.

Hole No.	Interval (m)	Width (m)	Pb (%)	Zn (%)	Cu (%)	Ag (g/t)
85-1	9.1-15.7	6.6	1.42	2.63	0.019	29.14
	14.4-15.7	1.3	4.07	9.70	0.063	101.49
85-3	229.3-232.9	3.6	0.56	1.50	0.053	6.51
	255.9-256.5	0.6	1.15	1.94	0.081	17.14

12. **Norman Pitre**

(b) Narrows Claim Gp. (473272) 21 P/5W

This property, consisting of six claims, lies west of the Nepisiguit River "Narrows".

Work reported in 1986 comprised a soil sampling survey over a VLF EM conductor detected during the winter. A few samples had anomalous contents of copper, lead and zinc.

14. **Lac Minerals Limited**

Tetagouche Property, M.L. 1097
(473192, 473226) 21 O/9E

This property is located 30 km west of Bathurst and approximately 2.5 km southwest of Lower Tetagouche Lake, Restigouche County.

One drill hole was completed to a depth of 335 m. An assay of core between 317 and 319 m yielded 0.2 g/t Au, 117.9 g/t Ag, 5.76% Cu, 8.72% Zn and 1.16% Pb.

15. **Anaconda Canada Exploration Ltd.**

(a) Armstrong "B" Property, M.L. 1100
(473282) 21 O/9E

This Mining Licence is located 29 km west of Bathurst and is easily accessible via Highway 180 which crosses the southern portion of the property. The sulphide zone consists of a number of lenses of disseminated and massive banded sulphides (zinc-lead-silver-copper) up to 7 m in thickness but less than 300 m in strike length.

In 1986, a limited gravity survey was conducted 300 m south of the known zone in an area of previously defined EM conductors. A very weak anomaly was detected on one line but it has no lateral extent. The "B" zone mineralization may be weakly expressed on three lines, extending up to 550 m south of the known occurrence.

(b) Armstrong "A" Property, M.L. 1017
(473296) 21 O/9E

This Mining Licence is located 27 km west of Bathurst and is easily accessible via Highway 180. The sulphide zone

lies 2 km northeast of the Armstrong "B" sulphide occurrence. These massive sulphides occur in two lenses in Tetagouche Group rocks, with combined estimated reserves of 3 175 000 t of ore assaying 0.29% Cu, 0.42% Pb, 2.29% Zn, 2.4 g/t (0.07 oz./ton) Ag and 0.7 g/t (0.02 oz./ton) Au.

Gravity surveying was carried out in 1986 over an area previously explored using IP, VLF EM, magnetometer and soil surveying in the northwest portion of the claim group. A weak (0.1 mgal) anomaly was found to be coincident with an IP trend and is recommended for trenching.

(c) Orvan Brook Property, M.L. 1213 (473281) 21 O/9E

This Mining Licence is located 32 km west of Bathurst, immediately southwest of Lower Tetagouche Lake. The property hosts a small massive sulphide occurrence (Orvan Brook South) in Tetagouche Group sedimentary rocks. Mineralization consists of massive pyrite-sphalerite-galena-chalcopyrite up to 1 m in thickness and 150 m in strike length.

A gravity survey on two lines in 1986 suggests continuity of the sulphide zone east of the known zone.

(d) McMaster Property, M.L. 1037 (473300) 21 O/9E

The McMaster sulphide zone is located 46 km west of Bathurst, just north of Caribou Depot. The occurrence is a low-grade copper deposit (disseminated to massive pyrite-chalcopyrite) that occurs in Tetagouche Group rocks.

A gravity survey initiated in 1985 was completed over the eastern half of the Mining Licence. The previously detected anomaly that coincides with an EM conductor axis does not extend beyond the 1985 survey area; however, because this anomaly occurs beyond the limit of previous diamond drilling, further investigations are recommended.

16. **Granges Exploration Ltd.**

(a) Rogers Lake North Claim Gp. (473313) 21 O/8E

A total of 26.7 km of linecutting was completed over this group of 41 claims, which is located 40 km southwest of Bathurst and north of the Heath Steele mine. The grid was cut in preparation for a MaxMin EM survey.

(b) Goodwin Lake - Maliseet Mountain Claim Gp. (473314) 21 O/8W

This group of 143 claims is located 65 km southwest of Bathurst and 16 km northwest of the Heath Steele mine. Exploration has centred on nickel-copper mineralization within Devonian gabbro at Maliseet Mountain. Following extensive linecutting (175 m) and horizontal-loop EM surveying (146 km), a number of conductive zones have been recommended for drilling (12 holes).

17. **John Duffy**

Taylor Brook Road Property,
M.L. 1296 (473316) 21 O/8E

This property is located 40 km southwest of Bathurst and is accessible by the Heath Steele-Bathurst road. Granges Exploration drilled two diamond-drill holes in 1986 to test an EM conductor and penetrated felsic volcanic rocks of the Tetagouche Group to depths of 132 and 127 m. Hole number JD-1 intersected a conductive zone of 50% to massive sulphides from 106 to 116 m. The best assay was 3.20% Zn, 0.90% Pb, 18.9 g/t (0.55 oz./ton) Ag and 0.24 g/t (0.007 oz./ton) Au over 0.9 m. Hole number JD-2 intersected a similar conductive zone from 112 to 122 m. The best assay for this hole was 1.70% Zn, 0.02% Pb, 0.07 g/t (0.002 oz./ton) Au over 0.3 m.

18. **Cominco Ltd.**

Stratmat Property, M.L. 1007 (473286) 21 O/8E

The Stratmat property is located 5 km northwest of the Heath Steele mine and is accessible via haulage roads from Highway 430. It is underlain by Tetagouche Group felsic volcanic rocks and lesser sedimentary rocks. The Stratmat "Main Zone" is contained within the Mining Licence, and consists of a copper-rich and a lead-rich zone that has a strike length of 160 m, varies in width from 5 to 23 m and has a vertical depth of 150 m.

A series of trenches were excavated over the sulphide zone to test for the presence of an economic gossan zone. The trenches exposed massive sulphides with minor ferricrete capping, overlain by a 0.5 m thick black sulphide mud/sand. The mud/sand was enriched in Au and Ag: up to 1.03 g/t (0.03 oz./ton) Au and 66.9 g/t (1.95 oz./ton) Ag. No gossan was uncovered in the trenches and further exploration for economic gossan is not recommended.

19. **K.D.A. Whaley**

(a) Stratmat West Claim Gp. (473304) 21 O/8E

The Stratmat West property consists of 25 claims located 5 km west of the Heath Steele mine. The property is underlain by Tetagouche Group felsic volcanic and sedimentary rocks and was previously explored by Cominco during the period 1974-1976. U.S. Borax Inc. optioned the ground for the purpose of drill testing previously outlined IP and soil anomalies. Hole SWD-1 tested a gossanous felsic tuff with coincident soil and IP anomalies to a depth of 154 m. Weak sulphide mineralization equivalent to the Stratmat mineralized sequence was intersected from 142 to 154 m (no assays reported). Hole SWD-2 tested a coincident soil (Zn) and IP anomaly to a depth of 154 m. The Stratmat mineralized sequence (carrying 1-3% pyrite) was intersected from 66 to 113 m (no assays reported).

(b) Stratmat (North) Claim Gp. (473271) 21 O/8E

This 12-claim group, located 5 km northwest of the Heath Steele mine, has apparently been optioned to U.S. Borax Inc. Interest in the area was aroused by geochemically anomalous soils outlined during a compilation study.

In 1985, linecutting, VLF EM, magnetometer, HEM, soil geochemical and geological surveys were carried out.

The area is underlain by northeasterly trending layers of dark grey, grey-green and siliceous felsic volcanic tuffs, with interlayered chert and mafic volcanic rocks.

The soil survey proved to be disappointing, but anomalies coincident with weak VLF conductors were outlined.

20. **Noranda Exploration Company Limited**

(a) Half Mile Lake Property, M.L. 1010 (473318) 21 O/8W

This Mining Licence is located 67 km northwest of Newcastle and 70 km southwest of Bathurst near the headwaters of the Northwest Miramichi River. The property hosts a portion of the Halfmile Lakes deposit, which is a stratiform Bathurst-type massive sulphide deposit in Tetagouche Group rocks. Mineralization consists of a number of disseminated to massive lenses of zinc-lead-silver-bearing sulphides that have been defined over a 2134 m strike length and 122 m thickness within argillite and felsic tuffs. The Mining Licence hosts 7 801 000 t of ore grading 7.81% Zn, 2.48% Pb, 23 g/t Ag and 0.08% Cu. It was optioned from Conwest by Brunswick Mining and Smelting in 1985.

A gravity survey was conducted over the sulphide zone to define the surface expression of the deposit in preparation for diamond drilling. A survey grid was established to accurately locate previous drill holes and their elevations.

(b) Otter Brook Claim Gp. Project 4310 (473274) 21 O/8E

This group comprises 48 claims adjoining the western boundary of the Heath Steele mining lease. Interest in the area was aroused more than 30 years ago by airborne electromagnetic anomalies. Later, a sulphide boulder yielding an assay of 5.75% Cu was found near one of the EM anomalies. However, no significant sulphide mineralization has since been found in place. The claims are underlain by westerly trending, polydeformed, felsic volcanic and sedimentary rocks.

Noranda's exploration programme consisted of linecutting, VLF EM, magnetometer, HEM, and soil geochemical surveys to follow up two airborne electromagnetic anomalies (nos. 30 and 40). Anomaly 40 comprised three VLF ground anomalies, but it is not clear if anomaly 30 was covered.

Soil analyses revealed a Pb anomaly coincident with VLF EM and magnetic anomalies.

(c) Miramichi Claim Gp., Project 4214 (473288)

21 O/1E

This group of 26 claims is located 21 km south of the Heath Steele mine and is accessible via the Bear Lake road to the Sevogle airstrip. The property is underlain by Ordovician felsic tuffs with interbeds of slate and quartz wacke. The exploration programme undertaken by Brunswick was directed at discovering epithermal silver mineralization related to prominent lineaments on the property.

A portion of the old 1981 grid was re-established in three favourable areas and soil samples taken were analyzed for gold, silver and arsenic. Each area is anomalous in silver and arsenic (up to 27 ppm Ag and 730 ppm As) and is coincident with faults. Encouraging soil results led to a panned concentrate programme (HMC), the results of which were not encouraging. While silver values are not high (less than 2 ppm), anomalous arsenic (50-260 ppm) and antimony (1-9 ppm) are evident in some areas. No gold anomalies were detected in either soil or silt samples. Results of a silt sampling programme carried out in conjunction with the HMC programme are not reported. The three favourable areas were prospected and 118 rock samples were collected. Most samples were strongly sheared and leached felsic volcanic rocks and sedimentary rocks. All samples were analyzed for gold, silver, arsenic and antimony. Results were discouraging, with maximums of 8 ppm Ag, and 140 ppb Au, although arsenic ran to 24 000 ppm. A number of rocks assayed in the 3.4-6.8 g/t (0.1-0.2 oz./ton) Ag range.

Follow-up surveys will be guided by silt sample results; trenching is recommended over the soil anomalies.

21. **Bryan Wilson**

Wilson Claim Gp. (473120)

21 P/5W

This claim group is located approximately 40 km southwest of Bathurst.

In 1984, proton magnetometer and EM-16 (VLF) surveys were completed along a re-established picket line. Magnetic relief is reported to be low and the VLF conductors are weak. Gravity and MaxMin II surveys were recommended.

22. **BP Resources Canada Limited**

(b) Mt. Frederick Clarke Claim Gp. (473266) 21J/06E

The Mt. Frederick Clarke prospect is 7.5 km south of Juniper in central New Brunswick.

The area is underlain by Lower Devonian rhyolitic and sedimentary rocks of the Tobique Group that are intruded by Devonian gabbro and granite. The property was staked because arsenopyrite-rich quartz veins found in float suggested potential for gold mineralization.

Prospecting of the ground did not result in the discovery of significant mineral occurrences in bedrock but three float samples were high in arsenic and one had associated gold. A small quartz-epidote vein with pyrite and arsenopyrite assayed 1350 ppb Au.

A soil geochemical survey was conducted along grid lines that were cut on the property. Samples were collected from the B-horizon and analyzed for 30 elements including gold. Three arsenic anomalies were delineated but only a few weakly anomalous gold values were found. No further work was recommended on the property.

23. Kidd Creek Mines Ltd.

(a) Peaked Mountain Claim Gp. (473275) 21 J/10E

This group of 17 claims is located 30 km north of Boiestown. The property is underlain by Ordovician mafic volcanic and sedimentary rocks that have been intruded by Devonian gabbro and granite. Tungsten, molybdenum and tin minerals occur in quartz veins cutting the mafic volcanic rocks and in greisen zones within the Dungarvon Granite.

Prospecting, soil sampling, magnetometer and VLF EM surveys were conducted over the property in 1985. A broad (600 x 200 m) area of anomalous tin and tungsten in soils was outlined near the granite/volcanic rock contact, which was delineated by the magnetometer survey. Coincident magnetic and VLF EM anomalies were attributed to pyrrhotite-rich black slate horizons known from boulders on the property.

Greisen-style mineralization found in boulders returned assays up to 5.35% W with associated molybdenum and beryllium ± copper and zinc. An attempt to locate the tungsten mineralization in bedrock was made by trenching, but excessive overburden cover prevented this. Sampling of the trench overburden suggests proximity to a bedrock source and further excavations are recommended.

(b) Dungarvon East Claim Gp. (473277) 21 J/10E

This group of 56 claims is located 20 km north of Hayesville and is accessible via lumbering roads. The property is underlain by the Devonian Dungarvon Granite, which is in contact with Ordovician slate and quartzite. The "Cleveland prospect", a copper-lead-zinc-tin-tungsten occurrence in greisen, was found in the area in 1959.

In 1985, geologic mapping, trenching and a single-line IP survey were conducted. The IP survey was targeted near the Cleveland prospect (which is no longer exposed in bedrock) and the sulphide-bearing zone did respond to IP.

A fault zone within the granite was also inferred. Subsequent trenching in the vicinity of the old showing failed to reach bedrock (the actual site is now part of the landowner's water supply) and it is possible that the original showing was not in bedrock. Trenching of previously detected soil anomalies failed to locate any greisen zones. Many of these trenches also failed to reach bedrock.

(c) Dungarvon Property, M.L. 1379 (473278) 21 J/10E

This Mining Licence is located 10 km north of Hayesville and is accessible via Miramichi Lumber Company roads. The property is underlain by Devonian granite (Dungarvon Granite) that is in contact with Ordovician mafic volcanic rocks and minor argillite. This contact is essentially flat.

The 1985 programme entailed trenching and geochemical surveys. Soil samples collected north of the Little Dungarvon River confirmed that the optimum sampling media in the area is over "granite till" where C-horizon carries up to 337 ppm Sn. Trenching was conducted along strike of mineralization exposed in 1984 and confirmed the strike extension of the tin-bearing veins a further 200 m. Assays of rock samples were not reported; however, profile sampling of the overlying till from the trenches clearly shows anomalous tin over vein material.

(d) Trout Lake Claim Gp. (473268) 21 J/10E

This group of 26 claims is located 10 km west of Hayesville and east of the Burnthill tungsten mine. The property is underlain by high-grade metamorphic paragneiss and schist of Cambro-Ordovician age that have been intruded by Devonian gabbro and granite. The ground has been actively explored for greisen-hosted tin-tungsten deposits.

In 1985, a programme of linecutting, mapping, soil sampling, trenching, IP, VLF EM and magnetic surveying was conducted. Approximately one half of the property is underlain by the Trout Brook Granite, which has thermally metamorphosed the Cambro-Ordovician sedimentary rocks along its contact. Two styles of mineralization were exposed in trenches: tin in intensely greisenized granite and tin in younger cross-cutting quartz veins. Greisen-style mineralization is characterized by tin-tungsten-molybdenum-beryllium in zones up to 3 m wide, which assay up to 3.68% Sn in grab samples and 0.54% Sn in channel samples. Quartz vein mineralization is less widespread and tin concentrations are lower (200-300 ppm Sn). Tungsten minerals occur in some boulders but the source has not been identified.

The geochemical data suggests that tin concentrations increase with shallowing overburden thickness; however, favourable greisens do correlate with the stronger anomalies. Fluorine has a positive correlation with tin in soils. The IP survey effectively outlined greisen zones confirmed by trenching. Twelve IP targets were delineated. The magnetometer survey traced the sediment/granite contact and the VLF EM survey outlined faults and alteration zones within bedrock. Not all IP targets have been tested.

(e) Rocky Brook Property,
M.L. 1334 (473182) 21 J/10E

The Rocky Brook property is located approximately 15 km northwest of Hayesville, York County.

B-horizon soil samples were assayed for tin and tungsten; the highest values recorded were 45 ppm W and 34 ppm Sn.

MAGAGUADAVIC-ST. CROIX ZONE

25. **Maritime Resources Research Ltd.**

(b) Sheba Extension Claim Gp. (473285) 21H/13E

The claim group is about 23 km northwest of Sussex and 2 km east of the Trans-Canada Highway. The area is underlain by intensely deformed, Late Silurian mafic and felsic volcanic rocks and metasediments. One hole was drilled in an electromagnetic conductor. A pyritiferous zone was intersected, but gold assays were not published at the time of writing this report.

27. **Shediac Bay Resources Inc.**

Zealand Station Claim Gp. (473251) 21J/02W

The claim group is on the southwest side of Highway 104 and 616, near Zealand Station, about 40 km west of Fredericton.

The property is underlain by Devonian granite that intrudes Silurian metasediments.

Beryl was discovered at Zealand Station in the late 1950s. Small amounts of molybdenite are associated with the beryl. Kaolinite and muscovite resulted from the alteration of potash feldspar.

An area 61 x 152 m was stripped and 106 samples were collected and analyzed for beryllium oxide and rare earth elements. A preliminary estimate suggests possible reserves of 147 000 t grading 0.74% BeO.

28. **Morton Gordon**

(a) St. Stephen Nickel Claim Gp. (473252) 21G/03W

The claim group is east and west of Highway 740 and immediately north of the town of St. Stephen in southwestern New Brunswick.

The St. Stephen mafic complex is composed of Devonian peridotite, troctolite, anorthosite, olivine gabbro, and norite that intrude Ordovician graphitic slate, siltstone, and sandstone of the Cookson Formation and their metamorphosed

equivalents. The intrusion contains the Rogers Farm and Hall-Carroll nickel-copper-platinum deposits. The discovery of low-grade platinum has revived interest in the deposit. Recently collected samples averaged 0.94% Ni, 0.12% Cu, 830 ppb Pt, and 75 ppb Pd. Previous reserve calculations indicated that the deposit contains more than 907 000 t of ore grading 1.03% Ni and 0.47% Cu.

In 1986, a few magnetic profiles were carried out across the deposit with a proton precession magnetometer. Metallurgical methods to develop the deposit were evaluated by consultants.

29. **Mascarene Mines Limited**

St. George Claim Gp. (473255) 21G/02W

The property is about 4 km south of the town of St. George, near Letete. The area is underlain by intensely deformed Silurian felsic volcanic and sedimentary rocks.

Veins and disseminations of chalcopyrite, pyrite, pyrrhotite, sphalerite, galena, and gold occur near the sheared contact between volcanic and sedimentary rocks. Some samples from the dump at the "old Oliver Cameron mine" yielded up to 24 g/t (0.702 oz./ton) Au.

In 1986, an induced polarization survey was conducted on the property. A significant IP anomaly was delineated on strike with the Oliver Cameron copper-gold occurrence. More IP work, followed by trenching and/or diamond drilling, was recommended.

30. **J.A.R. McIntyre and P. Fenety**

Shear Gold Mine Claim Gp. (473327) 21G/07E

The "Shear gold mine" property is immediately northeast of the Saint George Batholith, about 60 km south of Fredericton. The property was optioned by Stratabound Minerals Corporation.

The claim group occurs along a northeast-striking, steeply dipping, dilatent shear zone in a narrow band of Silurian metasediments that are intruded by Late Devonian granite of the eastern Saint George Batholith. The mineralized rocks are silicified and pyritized.

In 1986, Messrs. Fenety and McIntyre of Moncton rediscovered the "Shear gold mine" shaft. In the same year, the property was prospected and representative samples from the dump and shaft were assayed by various companies. Grab samples collected by the claim holders assayed between 4.5 and 9.6 g/t (0.13-0.28 oz./ton) Au.

CALEDONIA ZONE

28. **Morton Gordon**

(b) Golden Grove Graphite Claim Gp. (473227) 21H/05W

The claim group is about 25 km northeast of the city of Saint John. The area is underlain by metasedimentary and metavolcanic rocks of the Precambrian Green Head and Coldbrook groups, respectively. The Green Head Group is composed mainly of intensely deformed limestone, dolomite, quartzite, biotite schist, and graphitic schist. Gneissic syenite, granodiorite, granite, and gabbro occur as fault slices in the metasedimentary and metavolcanic sequence.

The property was staked for its graphite potential. In the trenched zone, graphitic bands are intercalated with carbonate, quartzite, biotite-muscovite schist, and quartzofeldspathic schist. The graphite content varies from trace amounts to nearly 100% within a width of about 1 m. The graphite content of the high-grade zone is 35-40%. VLF EM and magnetometer surveys were conducted on the property. Polished thin sections were prepared from samples of graphitic schist. Graphite flakes range in size from 20 to 300 microns. Material from high-grade lenses ranges in size from 75 to 300 microns.

(c) Millican Lake Claim Gp. (473287) 21H/04W

This claim group extends eastward from Millican Lake and the southeastern shore of Balls Lake, about 15 km southeast of Saint John. The southern part of the property is composed of Precambrian granite and granodiorite that are unconformably overlain by Carboniferous or older arkosic siltstone, sandstone, and conglomerate similar to those at Cape Spencer. The northern part is composed of Carboniferous quartzose sandstone, conglomerate, and shale. The Precambrian rocks and the Carboniferous or older sedimentary rocks are commonly altered to sericite and clay minerals.

A grid that was cut on the property was used to conduct a soil geochemical and magnetic survey. Humus samples collected along the grid lines yielded assays from less than 1 to 15 ppb Au. An anomaly was found immediately downslope from the sheared granite contact and several others were found within the granite. Heavy-mineral analyses from C-horizon till samples yielded assays from 5 to 11 465 ppb Au. Assays from altered rock samples ranged from 5 to 1375 ppb Au.

31. **Rex Silver Mines Ltd.**

(a) Chance Harbour Claim Gp. (473306) 21G/01W

The Chance Harbour claim group is 18 km west of Saint John and about 1 km north of the village of Chance Harbour.

The oldest rocks in the area are mafic and felsic volcanic rocks of the Late Precambrian Coldbrook Group, which constitutes part of a prominent thrust slice. The Coldbrook Group is intruded by granite porphyry of Precambrian age.

Quartz veins are locally abundant along fracture zones in these rocks. The host rocks adjacent to the veins are silicified, epidotized, and carbonatized. Pyrite and gold occur in varying amounts in the altered rocks.

During 1986, two holes were drilled in the property to test VLF EM and soil anomalies. Disseminated pyrite and base-metal sulphides were intersected, but no gold was found.

(b) Goose Creek Claim Gp. (473305) 21G/01W

The Goose Creek Claim Group is about 5 km south of the community of Musquash and 14 km west of the City of Saint John. The property is bound on the west by the Pork Ledge claim group of P. Fenety.

The area is underlain by Precambrian granodiorite, quartz diorite, and granite porphyry that are unconformably overlain by Carboniferous limestone and clastic sedimentary rocks.

Four short holes were drilled in 1986 to test VLF EM and soil anomalies. Assays did not show any anomalous gold values.

32. Kinbauri Gold Corp.

Chance Harbour Claim Gp. (473225, 473276) 21G/01W

The claim group extends from Chance Harbour eastward along the Bay of Fundy coast.

The area is underlain by Precambrian mafic and felsic volcanic rocks of the Coldbrook Group that are intruded by granite porphyry and diabase. The granite is thrust over Carboniferous clastic sedimentary rocks. The thrust contact between the granite and sedimentary rocks is cut by numerous quartz veins. The host rocks are sericitized and carbonatized, and they contain highly anomalous amounts of gold, molybdenum, calcium, arsenic, lead, silver, selenium, and antimony.

A total of 1327 humus samples were collected and analyzed for gold. A prominent, easterly trending gold anomaly about 900 m long was delineated in the central part of the property. It includes numerous values over 20 ppb and up to 169 ppb Au. The background is less than 2 ppb Au. Isolated anomalies were also found in other parts of the property.

33. P. Fenety

(a) Pork Ledge Claim Gp. (473307) 21G/1W

The Pork Ledge claim group is about 5 km south of the Village of Musquash and 16 km west of the City of Saint John. The property was optioned to Rex Silver Mines Ltd.

The area is underlain by Precambrian granodiorite, quartz diorite, and granite porphyry that are unconformably overlain by Carboniferous limestone and clastic sedimentary rocks.

Six short holes were drilled in 1986 to test VLF EM and geochemical soil anomalies. Assays yielded some anomalous gold values, but no ore-grade material was intersected.

(b) McKenzie Brook Claim Gp. (473169) 21 H/4W

This group of three claims is located on the west side of the road to Cape Spencer, southeast of Saint John.

Reconnaissance mapping was continued. Fourteen rock chip and four silt samples were collected and assayed for lead, zinc, copper, silver and gold. An assay of 0.034 g/t Au was reported.

34. **Newbrun Resources Ltd.**

Gooseberry Cove Claim Gp. (473253) 21 G/1W

This claim group is located along the west side of Musquash Harbour, about 12 km southwest of Saint John. The area contains Precambrian gold-bearing and base-metal-sulphide-bearing granite porphyry that intrudes granodiorite.

In 1985, a gold anomaly was delineated in the northern part of the property. In 1986, representative samples were tested for resistivity and IP effect in preparation of an IP survey of the property.

35. **Wayne Hunter**

Cape Spencer Claim Gp. (473170, 473290)
(McKenzie Brook) 21H/04W

The claim group is at McKenzie Brook, about 2 km northwest of Cape Spencer. The area is mostly underlain by intensely deformed clastic sedimentary rocks of Carboniferous or older greyish purple siltstone, slate, sandstone, and polymictic conglomerate of the Cape Spencer Formation. These rocks are thrust over grey sandstone and conglomerate of the Lancaster Formation. Anomalous amounts of gold are associated with hydrothermally altered rocks along the thrust fault.

In 1985, work on the property consisted of a VLF EM Radem survey and the digging of two trenches. In 1986, four trenches were dug across the altered zone. Rock samples were collected from the altered rock outcrops and some panning was done on the property. Assays were not available at the time of writing this report.

36. **H.C. McNamara**

(a) Cape Spencer Project,
M.L. 1347 (473234) 21H/04W

The claim group borders the southeast shoreline of Millican Lake, about 15 km southeast of Saint John. The area is underlain by Precambrian or younger granite and granodiorite

that are unconformably overlain by Carboniferous or older clastic sedimentary rocks similar to those at Cape Spencer. Both the granitic and sedimentary rocks are intensely deformed and constitute part of a prominent northeast-striking thrust zone. Gold associated with pyrite is in deformed, intensely altered, sedimentary rocks along the thrust zone close to the unconformity.

During 1986, panning of tills followed by trenching led to the discovery of gold-pyrite concentrations in eight areas between Millican Lake and the boundary of the Gordex property. This was followed up by an extensive diamond drilling program. The results of the drilling were not announced at the time of writing this report.

(b) Balls Lake Claim Gp. (473237) 21H/04W

This claim group is south and west of Balls Lake, about 12 km southeast of Saint John. The area is underlain by Carboniferous sandstone and conglomerate. In 1985, anomalous gold values ranging from 277 to 720 ppb Au were found immediately adjacent to Balls Lake.

Panned concentrates from six till samples, collected along these lines, assayed between 10 and 442 ppb Au.

37. **Tournigan Mining Exploration Ltd.**

Fundy Project Claim Gp. (473262) 21H/10W

The claim group is about 2 km east of Fundy National Park and 16 km north of Alma. The ground was staked in response to stream sediment gold anomalies discovered by Acadia Mineral Ventures Ltd.

The claim group is underlain by Late Precambrian mafic and felsic tuffs and metasedimentary rocks. The "old Teahan mine", a low-grade stratiform auriferous base-metal sulphide deposit is about 5 km west of the claim group.

Tournigan laid out a grid and conducted proton magnetometer and VLF EM surveys on the property. This work will be followed by field examination and soil sampling of areas delineated by geophysical anomalies.

MONCTON-CUMBERLAND BASIN

38. **J. Colucci**

Jordan Mountain Property,
M.L. 1384 (473279) 21H/14W

The claim group is about 13 km northeast of Sussex. The property was originally staked because of a copper-sulphide-bearing shear zone in Precambrian rhyolite. The rhyolite is unconformably overlain by Carboniferous conglomerate and sandstone, which locally contain malachite and azurite.

A boundary survey was done on the property to convert the claim group to a Mining Licence.

39. **J.A.R. McIntyre**

Stuart Mountain Claim Gp. (473246) 21H/15W

The Stuart Mountain claim group is about 14 km northwest of Riverside-Albert, immediately south of the Turtle Creek and Prosser Brook roads. The area is underlain by mafic and felsic volcanic and sedimentary rocks of the Late Precambrian Coldbrook Group. The area was staked for its gold potential. Soil and rock samples were collected over the property but no anomalous gold values were reported.

40. **J.A. Leslie**

Upper Dorchester Claim Gp. (473280) 21H/15E

The claim group is at Upper Dorchester, about 50 km southeast of the City of Moncton. The area was staked for its barite-celestite potential.

The area is underlain by bituminous shale, sandstone, and conglomerate of the Late Devonian to Early Carboniferous Albert Formation. The Albert Formation is overlain by limestone, gypsum, and anhydrite of the Carboniferous Windsor Group. The youngest rocks are sandstone and conglomerate of the Hopewell Group. Barite and celestite are associated with a prominent fault zone that crosses the area.

Three holes were drilled to investigate the extent of the barite and celestite mineralization. One hole intersected 2.89 m of celestite with minor barite.

CARBONIFEROUS PLATFORM

(1) **Brunswick Mining and Smelting Corporation Limited**

(o) Lawson Brook Property, M.L. 1356
Project 221 (473329) 21 P/5E

This Mining Licence is located 16 km west of the No. 6 mine site and is easily accessible via the Taylor Brook road. A single drill hole was completed to a depth of 764 m to test coincident magnetometer and gravity anomalies beneath Pennsylvanian cover. The hole penetrated Tetagouche Group volcanics at a depth of 209 m. The geophysical anomalies were attributed to a thick sequence of magnetic and calcareous basic tuffs and flows intersected from 426 to 764 m. A 0.2 m zone of massive pyrite was intersected at 410 m. There was no significant mineralization).

(p) Smoker Brook Property,
M.L. 1367 (473244) 21 P/4W

The Smoker Brook property is located approximately 3 km east of the junction of the Tomogonops and Northwest Miramichi rivers.

Work on the property in 1984-85 consisted of line-cutting, proton magnetometer, gravity and horizontal-loop EM surveys. Magnetic trends were reported to be rather weak. The gravity survey indicated that basic volcanics found on the property continue to the north. Most EM anomalies are weak, or can be explained by the presence of graphitic sediments.

26. **N.B. Coal Limited**

Coal Creek Coalfield, M.L.1307
(473249, 473250) 21 I/4E

The subject of this report is the coal underlying the area between Chipman and Coal Creek, northeast of Grand Lake, Queens County. In the winter of 1984, 82 test holes were drilled; lithological and geophysical logging were completed. The report summarizes coal reserves, mining equipment requirements, mining methods, manpower requirements, capital costs, and operating costs. Mineable reserves were calculated to be 2 405 228 t of coal in the Coal Creek area. Sufficient mineable coal exists to sustain the production of 136 078 t of coal annually for a 15-year period.

CONFIDENTIAL ASSESSMENT REPORTS[7]

The following assessment reports were received in 1986 and are kept confidential for a period of time under the provisions of the Mining Act.

Brunswick Mining and Smelting Corporation Limited

(a) Tetagouche River Claim Gp. (473320) 21 O/9W
Release date: Dec. 9, 1988

(b) McCormack/Ramsay Bk. Claim Gp. (473301) 21 O/10E
Release date: Sept. 30, 1988

(c) Rocky Gulch Claim Gp. (473319) 21 O/9W
Release date: Dec. 9, 1988

Lacana Mining Corporation Limited

(a) California Lake Claim Gp. (473315) 21 O/8E
Release date: Nov. 14, 1988

(b) Acad'or Claim Gp. (473289) 21 O/9E
Release date: Sept. 5, 1988

(c) Acad'or Claim Gp. (473328) 21 O/9E
Release date: Nov. 3, 1988

Rio Algom Exploration Inc.

(a) Simpson's Field West Claim Gp. (473310) 21 O/10E
Release date: Dec. 17, 1988
(b) Simpson's Field North Claim Gp. (473309) 21 O/10E
Release date: Dec. 17, 1988

Michael Smith

Simpson's Field Claim Gp. (473302) 21 O/10E
Release date: Sept. 21, 1988

MINERAL OCCURRENCES [2,3]

The mineral occurrences described below are those that have been worked on in 1986 (Figure 18). For the properties described in previous issues of this report, only the additional information is provided here.

Alcida Gold Deposit 21 P/13W

LOCATION The property is located 21 km northwest of Bathurst, in the Alcida-Dauversière area (Figure 18). (Lat. 47°46.5'N; Long. 65°52'W).

COMPANY Lacana Mining Corporation (Exec. Office) 1702, 150 King St. W., P.O. Box 19, Toronto, M5H 1J9 (30%), Murphy Oil Co., 1700, 800 6th Avenue SW, Calgary T2P 3Y3 (22.5%); Oakwood Petroleum Ltd., 1800, 311 6th Avenue SW, Calgary T2P 3H2 (22.5%); Sparton Resources Inc., 500, 67 Richmond St. W, Toronto, M5H 1Z5 (18.5%); Lynx-Canada Explorations, 520, 25 Adelaide St. E., Toronto, M5C 1Y2 (6.5%). Chief Geologist - A. Lee Barker.

HISTORY The initial discovery that aroused interest in this area was made by George Murphy, who was investigating an area selected by the New Brunswick Prospecting Syndicate. Electromagnetic, magnetic and soil geochemical surveys outlined anomalies over the original discovery ('discovery zone') and farther west in the 'west gabbro zone.' Trenching revealed gold- and silver-bearing mineralization in both zones. A number of holes have been drilled. Exploration costs are being paid by Lacana Mining Corporation, American Oakwood Energy Limited and Lynx Canada Explorations Ltd. Other small interests are vested in Acadia Mineral Ventures Ltd. and Silver Sceptre Mines Limited.

GEOLOGY The 'discovery zone' comprises northwesterly trending sphalerite-pyrite-galena-stibnite-arsenopyrite veins and disseminations that cut polydeformed Ordovician (Elmtree Group) metasedimentary rocks. The mineralization occurs near a contact with less deformed Silurian (Chaleurs Group) sedimentary rocks. Chip samples from this zone assayed up to 5.1 g/t (0.15 oz./ton) Au and 118.6 g/t (3.46 oz./ton) Ag over 1.8 m. The mineralization in the 'west gabbro zone' comprises pyrite, marcasite, arsenopyrite and pyrrhotite as fracture fillings and disseminations in a highly altered and fractured metagabbro sill and/or dyke that intrudes the Elmtree

sediments. The mineralized rocks have been traced for 260 m along strike, over a width of 18 m and to a vertical depth of 49 m. Some deeper holes indicate mineralization to a depth of 167 m. The gold content is variable, ranging from 2.1 to 5.5 g/t (0.06-0.16 oz./ton) Au over 18 m; however, narrower sections (1-2 m) assayed 6.9-13.7 g/t (0.2-0.4 oz./ton) Au.

RESERVES No estimate of reserves has been made.

PROPERTY & DEVELOPMENT The property comprises approximately 126 claims. Several trenches, and more than 50 drill holes have been completed.

Annidale Copper, Gold — 21 H/13W

LOCATION The Annidale copper deposit is about 2 km south of Annidale, Kings County (Figure 18).

COMPANY The property is presently held by W.G. Walton and is under option to Lac Minerals Ltd.

DEVELOPMENTS The property was optioned by Lac Minerals Ltd. and some diamond drilling was carried out in the gold-bearing chrome-mica zone during 1986. Some base-metal sulphides that were intersected contained silver and low-grade gold values locally. Lac Minerals remains interested in the property and further work is planned.

For additional information see Information Circulars 83-2, 84-1, 85-2, and 86-1.

Evandale Copper-Molybdenum-Gold — 21 G/9W

LOCATION The Evandale copper-molybdenum zone is located about 3 km west of Evandale (Figure 18).

HISTORY The mineralized zone was discovered in 1967 as a result of geochemical stream sediment sampling. A limited amount of soil geochemistry, geophysics and diamond drilling was carried out by Rio Tinto Exploration. Dome Exploration has conducted a limited drilling programme on the property.

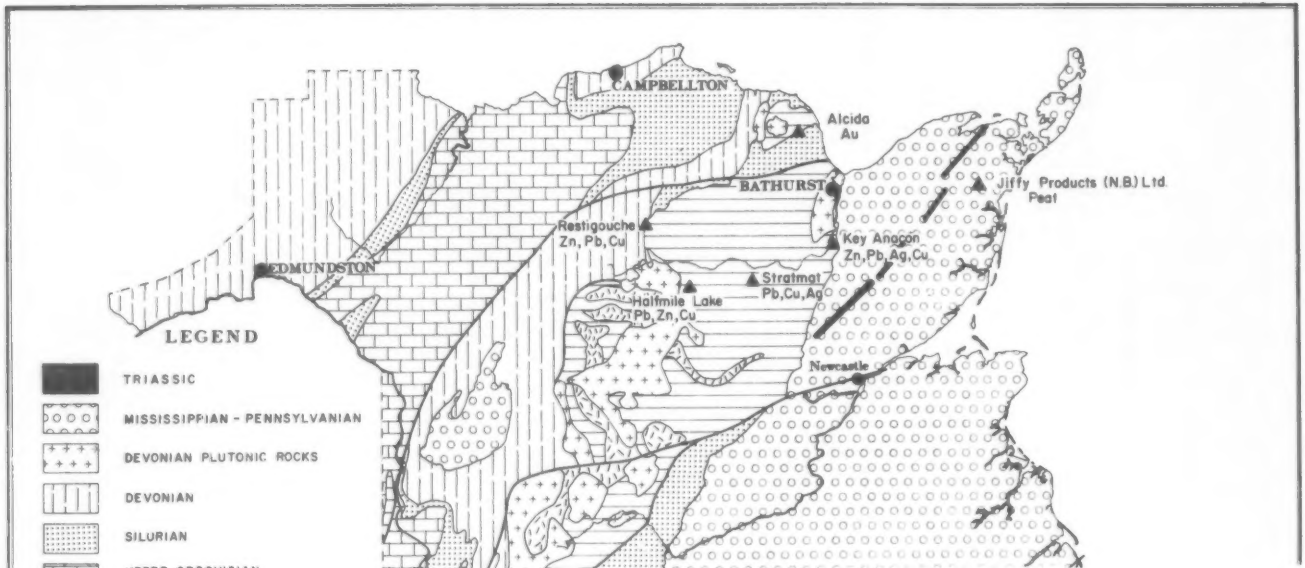
The copper and molybdenum sulphides occur disseminated and along fractures in a broad zone about 305 m wide and 2440 m long.

COMPANY The deposit is presently staked by Bruce G. Taylor.

DEVELOPMENTS The claim group was enlarged to cover the contact aureole of the intrusion. The economic potential of the property is being re-evaluated.

Halfmile Lakes Zinc-Lead-Silver-Copper — 21 O/8W

LOCATION The Halfmile Lakes deposit is 19 km west of the Heath Steele mine, Northumberland Co. It is accessible via Highway 430 and secondary roads (Figure 18). (Lat. 47°25'N; Long. 66°19'W)


CAMPBELLTON
Alcida
Au
BATHURST
Jiffy Products (N.B.) Ltd.
Peat
Restigouche
Zn, Pb, Cu
Key Anacon
Zn, Pb, Ag, Cu
EDMUNDSTON
Stratmat
Pb, Cu, Ag
Halfmile Lake
Pb, Zn, Cu
Newcastle
LEGEND
TRIASSIC
MISSISSIPPIAN - PENNSYLVANIAN
DEVONIAN PLUTONIC ROCKS
DEVONIAN
SILURIAN

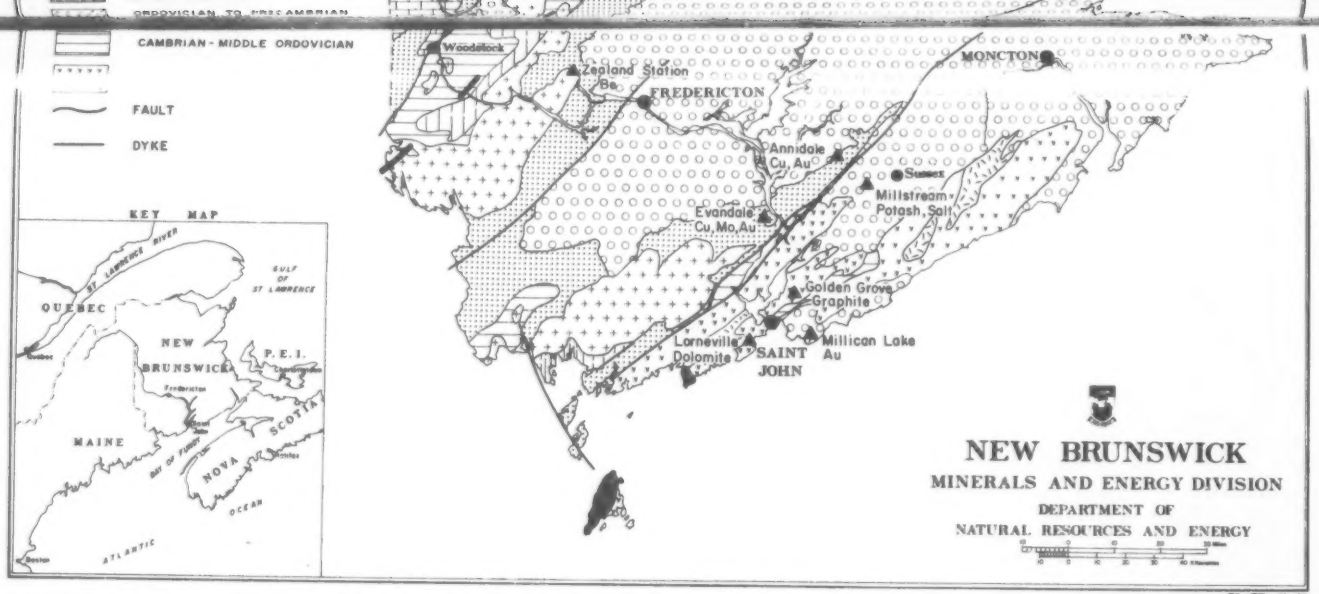


Figure 18. Metallic and nonmetallic mineral occurrences in New Brunswick.

COMPANY Falconbridge Limited now controls the Kidd Creek Mines part of the sulphide deposit, whereas Brunswick Mining and Smelting Corporation Limited along with Canacord Resources has optioned the Conwest part of the deposit. Canacord Resources contributed $300 000 to a flow-through share drilling program.

For additional information see Open File Report 82-31 and Information Circulars 83-2, 84-1, and 86-1.

Key Anacon Zinc-Lead-Silver-Copper 21 P/5E

LOCATION The Key Anacon deposit is located 23 km south of Bathurst in Gloucester County (Figure 18). (Lat. 47°26.1'N; Long. 65°41.8'W)

DEVELOPMENTS R.R. Irrinki of the New Brunswick Department of Natural Resources and Energy, Geological Surveys Branch, has completed ore reserve estimations for this deposit.

For additional information see Open File Report 82-31 and Information Circular 86-1.

Millican Lake Gold 21 H/4

LOCATION The Millican Lake gold property is located 15 km east of the City of Saint John. It extends from the Cape Spencer deposit northeast to Millican Lake (Figure 18). (Lat. 45°12'30"; Long. 65°54'30")

HISTORY Soil sampling and trenching (mostly in 1985 and 1986) made it possible to trace the gold-bearing zone from the Cape Spencer deposit northeastward to Millican Lake.

COMPANY The property is held by Mispec Resources Inc. Mr. Harold McNamara is company president.

DEVELOPMENTS About 80 short holes have been drilled on the property to delineate the ore zone. Drilling was guided by gold panning results (tills), trenching, and an induced polarization geophysical survey.

Restigouche Zinc-Lead-Silver-Copper 21 O/7, 10

LOCATION The Restigouche deposit is located about 60 km west of Bathurst in Restigouche County (Figure 18). (Lat. 47°30.2'N; Long. 66°33.5'W)

DEVELOPMENTS Lincoln Resources was unable to raise funds to carry out option committments. The property was optioned by Southwind Resources in 1986.

For additional information see Open File Report 82-31 and Information Circulars 83-2, 84-1, 85-2 and 86-1.

Stratmat Zinc-Lead-Copper-Silver 21 O/8E

LOCATION The Stratmat deposit is 5 km northwest of the Heath Steele deposit and about 50 km southeast of Bathurst in Northumberland County (Figure 18). (Lat. 47°18'N; Long. 66°07'W)

DEVELOPMENTS The west zone was drilled by Heath Steele Mines Limited (Brunswick Mining and Smelting Corp. Ltd.) to obtain metallurgical samples. Preliminary results indicate good grade zinc, lead, and silver, and excellent recoveries. Plans are being made to explore underground in 1987.

For additional information see Open File Report 82-31 and Information Circulars 83-2, 84-1, 85-21 and 86-1.

NONMETALLIC MINERALS[11, 12]

Four applications for Peat Exploration Licences were under review in 1986: (1) Satoturve Oy (Bog 324N); (2) AMR Peat Inc. (Bog 16); (3) Shediac Peat Moss Ltd. (Bog 76); (4) Acadian Peat Moss (1979) Ltd. (Bog 3). The application for Bog 76 by Shediac Peat Moss Ltd. has been rejected. Bog 536 is held by Jiffy Products (N.B.) Ltd. under Peat Exploration Licence 82-3.

During 1986, nonmetallic mineral exploration in the Province was virtually static with the exception of some limited activity associated with graphite and dolomite occurrences, both located in Saint John County and a beryllium showing in York County.

BP Resources Canada Ltd. (Selco Division) fulfilled the terms of its 1981 exploration agreement with the New Brunswick government and a Mining Lease was signed on July 29, 1985 covering 10 056 ha of the Millstream potash property, 10 km west of Sussex. The company has not announced a decision to proceed with the underground exploration phase of the project.

PEAT[12]

Jiffy Products (N.B.) Ltd.

COMPANY Jiffy Products (N.B.) Ltd., P.O. Box 434, Shippagan, N.B. E0B 2P0. The General Manager is Gérard R. Mallet. Telephone: (506) 336-4751.

RIGHTS Peat Exploration Licence 82-3 (277 ha) on Bog 536, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 536 is located 8 km north of Tracadie, between Pont-Landry and Ste-Rose. Access is by dirt road off Highway 11 (Figure 18).

HISTORY Jiffy Products (N.B.) Ltd. acquired the Peat Exploration Licence in 1982.

RESERVES AND GRADE 5.64 Mm^3 surficial peat and 3.23 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	218	47	265
>1 m	201	19	220

POTASH/SALT[11]

Millstream 21 H/12

COMPANY BP Resources Canada Ltd. - Selco Division, 55 University Avenue, Suite 1700, Toronto, Ontario M5J 2H7. The general manager is J. Hainey.

RIGHTS 10 056 ha Exploration Agreement, under Section 25(2) of the Mining Act, Chapter M-14.1, S.N.B. 1985.

LOCATION This property is located about 4 km east of Apohaqui and 10 km east of Sussex, Kings County (Figure 18).

HISTORY A drill hole (Millstream No. 1), completed in 1973 by the Department of Natural Resources, penetrated about 12 m of potash-bearing salt at a depth of 915 m, before it was abandoned because of technical difficulties. In May 1980, the Province called for tenders for the right to explore and develop a salt-potash prospect at Millstream and five tenders were received. After careful evaluation, the Province awarded the rights to BP Exploration Canada Ltd., now BP Resources Canada Ltd.

Between 1981 and 1983, 11 drill holes and related geological studies were completed to investigate the property. Results were extremely encouraging; potash beds were intersected at depths between 950 and 1050 m.

PRESENT OWNERSHIP BP Resources Canada Ltd. - Selco Division.

RESERVES AND GRADE Anticipated tonnages, and potash grades ranging from 20 to 30% K_2O are very encouraging.

PRODUCTION None.

DEVELOPMENT BP fulfilled the terms of its 1981 exploration agreement and successfully negotiated a Mining Lease with the New Brunswick government for this property (July 29, 1985).

Results from the surface drilling programme have been encouraging. However, BP continues to seek a suitable partner before proceeding with the next phase of the project, which includes shaft sinking and an underground exploration programme.

EMPLOYEES One.

DOLOMITE[11]

Lorneville 21 G/1E

COMPANY Great Horn Mining, Inc., Suite 1202, 67 Yonge St., Toronto, Ontario M5E 1J8.

RIGHTS 38.877 ha Exploration Agreement under Section 25(2) of the Mining Act, Chapter M-14.1, S.N.B., 1985.

LOCATION This property is located on the west coast of Lorneville Harbour, Saint John County, partially in the Lorneville Industrial Park. Access to the property is by paved Highway 810 approximately 1.5 km south of Highway 1, west of the City of Saint John (Figure 18).

HISTORY Interest in the Lorneville dolomite property can be traced back to the early 1970s when the deposit was initially investigated by Great Horn Mining Syndicate as a possible raw material source for the production of magnesium metal. A detailed mapping and shallow drilling programme was undertaken to prove up the extent and quality of the deposit; however, interest in the property eventually subsided.

In 1986, Norsk Hydro As, a Norwegian company, announced plans to construct a $450 000 000 magnesium metal plant near Montreal and indicated interest in securing an eastern Canadian dolomite source of suitable quality and extent to supply the proposed plant. The Lorneville property appears to be one of a number of deposits under consideration by the company.

PRESENT OWNERSHIP Great Horn Mining, Inc.

RESERVES AND GRADE A 1973 assessment of the deposit indicated dolomite reserves (to a depth of 30 m) in excess of 8 000 000 t grading 20.77% MgO.

PRODUCTION None.

DEVELOPMENT An Exploration Agreement between Great Horn Mining Inc. and the Minister of Natural Resources and Energy was negotiated in 1986. The company embarked on a limited drilling programe to further verify the extent and grade continuity at depth. Results appear encouraging.

BERYL[11]

Zealand Station 21 J/2W

COMPANY Shediac Bay Resources Inc., Suite 806, 88 University Avenue, Toronto, Ontario M5J 1T6

RIGHTS Property consists of 32 mineral claims encompassing an area of approximately 500 ha.

LOCATION This property is located in York County, near Zealand Station, approximately 40 km northwest of Fredericton (Figure 18).

HISTORY The Zealand Station beryllium occurrence has been worked periodically over the last 30 years. Stripping and trenching, detailed mapping and sampling, and related geochemical and geophysical surveys were carried out in 1985-86 by Shediac Bay Resources Inc.

PRESENT OWNERSHIP Shediac Bay Resources Inc.

RESERVES AND GRADE Estimated possible ore reserves of 147 000 t of ore grading 0.74% BeO.

PRODUCTION None.

DEVELOPMENT Detailed sampling in 1985-86 may stimulate further work on ore beneficiation and a subsequent drilling programme to determine the extent of the deposit at depth.

EMPLOYEES None.

GRAPHITE[11]

Golden Grove 21 H/5W

COMPANY Glenvet Resources, 177 King St. East, Saint John, New Brunswick E2L 4S5

RIGHTS Property consists of a block of 15 claims encompassing approximately 240 ha.

LOCATION The Golden Grove prospect is in the north-central part of Saint John County, approximately 25 km northeast of Saint John (Figure 18).

HISTORY Graphite was discovered at this location more than 50 years ago. In the 1930s numerous pits were excavated to investigate the occurrence; however, this occurrence has received only cursory attention prior to 1980. Work in 1982 and 1985 has involved regional and detailed studies by VLF EM and magnetometer studies, and trenching designed to further delineate the extent and quality of the occurrence.

PRESENT OWNERSHIP Glenvet Resources

RESERVES AND GRADE Trenching (1985) has apparently indicated a graphite horizon, 2 m in width and 425 m in strike length, which contains high-grade (30-38%) zones of carbon. Possible tonnage based upon the continuity of the material to depths of 150-300 m is estimated to be 225 000 to 450 000 t.

PRODUCTION None

DEVELOPMENT Recent geological and geophysical surveys have been relatively successful in further defining the extent of the occurrence; however, drilling will be required to verify the nature of the deposit at depth. Preliminary mineralogical and metallurgical test work appears to indicate considerable potential for the Golden Grove deposit as a source of flake graphite.

EMPLOYEES None

CHAPTER 3. MINE DEVELOPMENT IN NEW BRUNSWICK

METALLIC MINERALS[8]

The still-depressed metal prices have caused mining companies in the Province to change the focus of their exploration from base metals to precious and other metals. Development work continued at the tin property as well as concentrated exploration for gold in both the northern and southern areas of the Province.

Lac Minerals Limited (Mount Pleasant) 21 G/7W

LOCATION The Mount Pleasant property is situated about 50 km northeast of St. Stephen, Charlotte County (Figure 19).

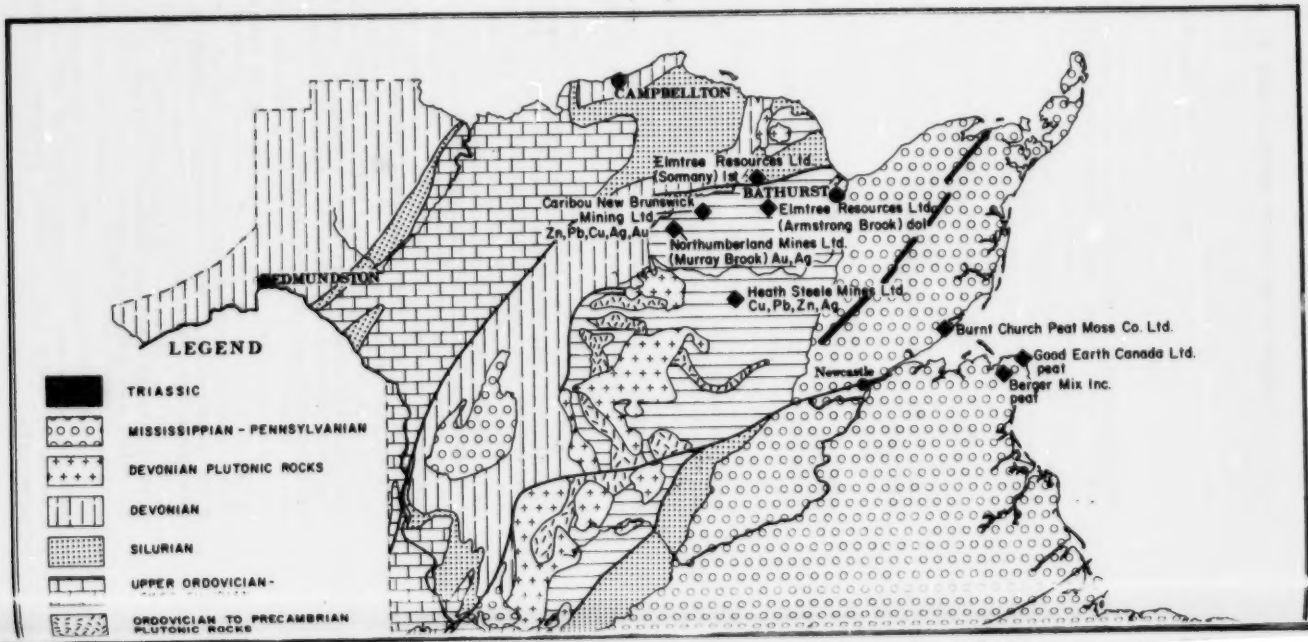
HISTORY A group called Geochemical Associates staked Mount Pleasant in 1954 for Selco Exploration Ltd. Selco drilled four holes in a geochemical anomaly, but no metallic minerals of interest were intersected and the property was returned to Geochemical Associates.

In 1956, Kennco Exploration (Canada) Limited optioned the property and drilled ten holes, but the results were disappointing and Kennco dropped the option. Mount Pleasant Mines Ltd. staked the ground in 1959. Kennco optioned the property again and drilled several holes that intersected tungsten, molybdenum and tin minerals, but the option was dropped again because the mineralized zone could not be followed.

In 1960, a trenching and diamond drilling programme combined with a detailed geological investigation by the Mount Pleasant Mines geological staff led to the discovery of a tin-base-metal ore zone in the northern part of the property. This ore zone is commonly referred to as the North Zone deposit. Deep drill holes also intersected tungsten-molybdenum ores in the northern part of the property (North Zone) and in the Fire Tower Zone (Mount Pleasant), but lack of sufficient funds prevented systematic drilling of these deeper ore zones. The delineation of the complex geology of the property guided subsequent exploration by Sullico Mines Ltd. This company optioned the property in 1967. Drilling by Sullico and later its wholly-owned subsidiary Brunswick Tin Mines Limited led to the delineation of the tungsten-molybdenum ore zones in the Fire Tower Zone and the North Zone.

In 1977, Billiton Canada Limited and Brunswick Tin Mines Limited made a joint venture agreement to bring the Fire Tower Zone's tungsten-molybdenum orebody (Fire Tower Zone West) into production. Mill construction and underground work were completed in 1983 when the first concentrates were produced. Commercial production started in 1984. The mine operated until July 31, 1985 and was forced to close as a result of very poor tungsten and metal prices.

On October 1, 1985, Lac Minerals entered a 50/50 joint venture agreement with Billiton to explore and possibly develop the North Zone tin deposit, located 1 km north of the present mine site.


CAMPBELLTON
Elmtree Resources Ltd.
(Somany) Ltd.
BATHURST
Caribou New Brunswick
Mining Ltd.
Zn, Pb, Cu, Ag, Au
Elmtree Resources Ltd.
(Armstrong Brook) dol.
Northumberland Mines Ltd.
(Murray Brook) Au, Ag
EDMUNDSTON
Heath Steele Mines Ltd.
Cu, Pb, Zn, Ag
Burnt Church Peat Moss Co. Ltd.
Good Earth Canada Ltd.
peat
Newcastle
Berger Mix Inc.
peat
LEGEND
TRIASSIC
MISSISSIPPIAN - PENNSYLVANIAN
DEVONIAN PLUTONIC ROCKS
DEVONIAN
SILURIAN
UPPER ORDOVICIAN -
ORDOVICIAN TO PRECAMBRIAN
PLUTONIC ROCKS

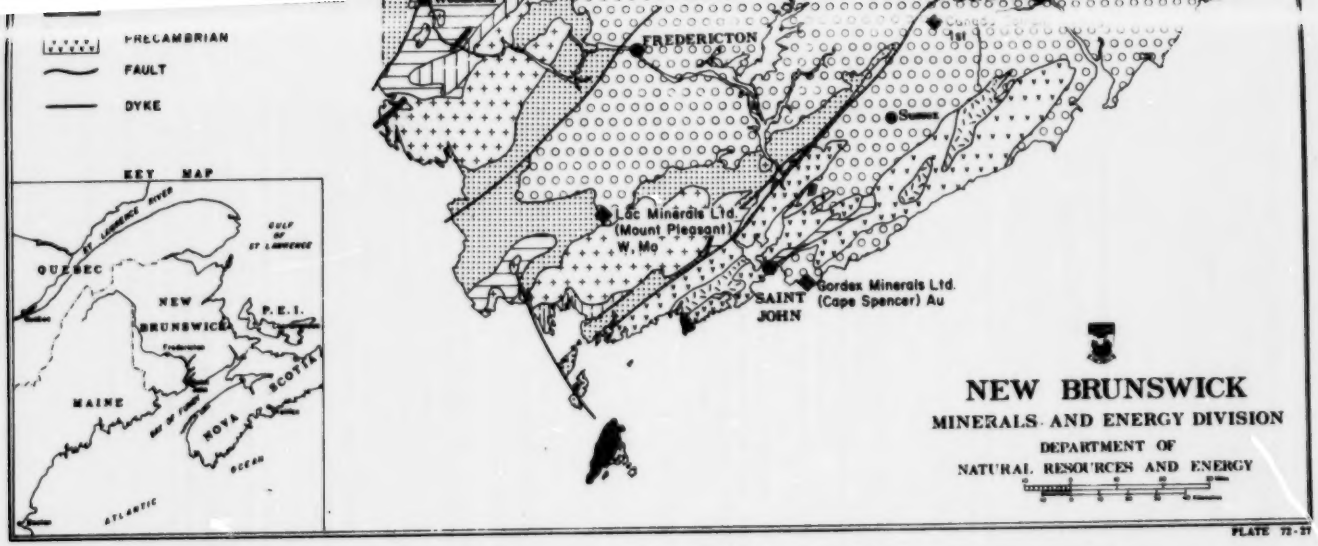


Figure 19. Mine properties in development stage in New Brunswick in 1986.

COMPANY The Lac/Billiton tin project is operated by Lac Minerals Ltd. with head offices at 2105 N. Tower, P. O. Box 156, Royal Bank Plaza, Toronto, M5J 2J4. Mine Office address is P. O. Box 150, St. George, New Brunswick, E0G 2Y0. The President is P. Allen and Vice-President (Expl.) is D. Sheehan, Mine Manager is B. Bradford.

RESERVES: (Published)

Zone	Reserves(t)	WO_3(%)	MoS_2(%)	Sn(%)
Fire Tower	12 220 000	0.38	0.2	
North	5 900 000			0.79

PRODUCTION There was no production in 1986 and none is planned for 1987.

DEVELOPMENTS Since October 15, 1985, Lac Minerals has completed 2100 m of underground development to provide drill access in areas of the deposit where additional information is needed. To the end of December, 1986, 12 200 m of underground drilling and 1480 m of surface drilling have been completed. Approximately 8000 m of drilling remains to be completed in 1987. Two bulk samples from underground totalling 2652 t have been processed at the site and sent off for metallurgical analysis. A feasibility study concerning the tin deposit should be completed by the end of 1987.

EMPLOYEES At the end of 1986 there were 17 employees on site.

Heath Steele Mines Limited 21 O/8W

LOCATION The Heath Steele mine is located 51 km northeast of Newcastle in Northumberland County (Figure 19). (Lat. 47°17'N and Long. 66°05'W)

HISTORY The deposit was discovered in 1954 by airborne electromagnetic surveying. Mining began in 1957 but was suspended between 1958 and 1962 because of low metal prices and poor recoveries. The mine reopened in 1962 with a contract to treat the ore from Cominco's Wedge mine. In 1968, the mine began operating under the name Little River Joint Venture, managed and owned 75% by AMAX and 25% by INCO. In 1979, Noranda acquired AMAX's 75% share and ASARCO acquired INCO's 25% share.

On April 29, 1983 sulphide operations ceased due to low metal prices and diminished revenues. The plant was converted to treat gossan ores in order to recover gold and silver. This cyanide treatment process started in July 1983. After some start-up problems, the plant operated well, treating a peak of 517 t/d. The gossan operations continued until October 1984.

In 1986 Brunswick Mining and Smelting acquired ASARCO's 25% share in the mine.

COMPANY The mine operates under the name Heath Steele Mines Limited with head offices at P. O. Box 45, Commerce Court West, Toronto, Ontario M5L 1B6. The mine office address is P. O. Box 4000, Newcastle, New Brunswick E1V 3M5. The President is J.C. White; the Senior Vice-President is J.W. Moerman and the Project Superintendant is D. Archibald.

RESERVES Mineral Inventory (December, 1986)

Reserves (t)	Cu (%)	Pb (%)	Zn (%)	Ag (g/t)	Au (g/t)
15 177 200	1.24	1.63	5.03	60.34	0.62

DEVELOPMENTS Heath Steele Mines Limited continued to maintain the property in respect to environmental requirements and to keep the mill in good condition. The relatively small increases in lead and zinc prices still were not at the level that would encourage the mine to reopen.

The Minerals and Energy Division is continuing its geological structure study of the Heath Steele deposits under the Canada-New Brunswick Mineral Development Agreement, which is jointly funded for $214 000. Results of this study are expected in 1989. As well, Heath Steele Mines Limited is spending in excess of $3 000 000 in exploration work on deposits near the mine.

EMPLOYEES At the end of 1986, there were 28 employees on site.

Gordex Minerals Limited (Cape Spencer) 21 H/4W

LOCATION The Gordex Minerals Limited gold property is located at Cape Spencer, 15 km southeast of the City of Saint John, along the Bay of Fundy coast (Figure 19).

HISTORY Minor amounts of gold were found near the lighthouse several years ago. The property was staked in 1979-1980 by Mr. Morton Gordon. An intensive exploration programme conducted during the summer of 1982 led to the delineation of an extensive alteration zone with numerous gold-bearing quartz veins. The company has received permission from the appropriate provincial departments to operate a 30 000 t demonstration plant to leach gold from the ores. A heap-leach process plant, designed by Witteck Development on contract to Gordex, has been constructed on site.

COMPANY The mine is owned by Gordex Minerals Limited with offices at P. O. Box 7071, Station A, Saint John, N.B. E2L 4S5. The President of Gordex Minerals Limited is Mr. H.E. Pawson.

RESERVES (Published) 671 328 t of ore, grading 3.3 g/t (0.096 oz./ton) Au, has been outlined on the property to a depth of 152 m. The property has potential reserves of 3 000 000 t.

DEVELOPMENTS Gordex Minerals Limited mined 30 000 t of ore from its surface workings on the Cape Spencer gold deposit in 1985. In addition, another 15 000 t was placed on the heap pad in 1986. The leaching of the gold with $Ca(CN)_2$ was carried out in the summer of 1986 and the recovery of gold from the demonstration heap leach was successful (Figure 20). Modifications are planned for the process in 1987 to improve on the effluent treatment system. At the end of the year, Gordex was carrying out a substantial exploration programme to confirm ore reserves in the Cape Spencer area.

EMPLOYEES The operation employs a staff of 10. This figure is expected to reach 35 once the mine has reached design capacity.

Caribou New Brunswick Mining Limited 21 0/9W

LOCATION The Caribou deposit is approximately 40 km west of Bathurst in Restigouche County (Figure 19). (Lat. 47°34'N; Long. 66°17.6'W)

HISTORY The mineralization was discovered in late 1955 by Anaconda Copper Mining Company through regional geological mapping using aeromagnetic maps and photo interpretation. Ground EM pinpointed the drill target. Anaconda excavated an adit in the late 1950s, and in late 1960s and early 1970s an incline was driven from the adit. Coincidentally, a 907 t/d mill with a copper concentrator was constructed. Mining of secondary (near-surface) copper took place between November,

Figure 20. H. Pawson of Gordex Minerals Limited pours gold at the Cape Spencer gold mine.

1970 and November, 1971. Metallurgical problems caused shutdown. Production resumed in September, 1973 and continued for one year. Extractive metallurgical research on lead, zinc, copper ore is continuing. In 1983 heap leaching of gossan was completed. Gold and silver extracted in 1983 amounted to 88 582.77 g and 1 688 018 g, respectively. In late 1986, East West Minerals, N.L. of Sydney, Australia acquired Anaconda Canada Exploration Limited and Caribou Chaleur Bay Mines Ltd., which constitute the Caribou property.

COMPANY Caribou New Brunswick Mining Limited, P. O. Box "A", Bathurst, N.B. E2A 3Z1. Head Office is East West Minerals, Inc., 3 Harbor Drive, Suite 103 Sausalito, California, 94965. The Chief Executive Officer is Mr. Tony D.S. Wicks; Site Engineer is Mr. C.N. Smith, P. Eng.

RESERVES

Reserves (t)	Cu (%)	Pb (%)	Zn (%)	Au (g/t)	Ag (g/t)
60 135 000	0.47	1.70	4.48	1.77	58.61

With higher cut-off grades of lead plus zinc, 16 200 000 t of ore is indicated.

PRODUCTION Secondary copper ore was produced.

	Ore (t)	Cu (%) Av. grade
Open Pit (Nov. 1970-Sept. 1974)	825 552	3.4

DEVELOPMENTS The company announced plans to install a plant capable of treating 2000 t of ore per day. The company projects production would begin at 1000 t and rise to its full rate during the first year of operation. The company's research has established that a bulk zinc-lead concentrate close to an ideal specification for feedstock to an Imperial Smelting Furnace can be produced.

Northumberland Mines Limited (Murray Brook) — 21 O/09W

LOCATION The Murray Brook sulphide deposit is located approximately 80 km west of Bathurst (Figure 19).

HISTORY The deposit is one of more than 30 polymetallic massive sulphide bodies outlined in the 1950s. Northumberland Mines Limited optioned the property from Kennco Explorations (Canada) Ltd. in 1985 and is primarily interested in the precious metal content of the gossan.

COMPANY The Murray Brook project is operated by Northumberland Mines Limited with head office at 67 Richmond Street West, Toronto, Ontario, M5H 1Z5. The President is Dr. William L. Young, P. Eng.

RESERVES A preliminary pit evaluation programme indicates a mineral reserve of 1 600 000 t of gossan grading approximately 1.22 g/t Au and 43.42 g/t Ag.

DEVELOPMENTS Northumberland presented a feasibility report and an existing-environment report to the New Brunswick Department of Natural Resources and Energy and to the Department of Municipal Affairs and Environment in September of 1986 for approval. At year's end, the Departments were reviewing the submissions.

NONMETALLIC MINERALS[11, 12]

Three companies were in a development stage in 1986 (Figure 18): Berger Mix Inc., Burnt Church Peat Moss Co. Ltd., and Good Earth Canada Ltd., who obtained a lease for Bog 338, previously held by Gulf Peat Co. Ltd.

Elmtree Resources Ltd. continued development work on the high-grade calcic limestone deposit at Sormany, although plans for quarrying a dolomite deposit near Armstrong Brook have been delayed (Figure 19).

Canada Cement Lafarge Ltd. with the cooperation of Havelock Lime Works Ltd. opened a new quarry site about 1/2 km east of its existing cement plant at Havelock. The high-calcium limestone is quarried by Canada Cement and a significant tonnage is supplied to Havelock Lime Works Ltd. as kiln feed under contract terms mutually agreed to.

PEAT[12]

Burnt Church Peat Moss Co. Ltd.

COMPANY Burnt Church Peat Moss Co. Ltd., P. O. Box 78, Shippagan, New Brunswick E0B 2P0. Telephone: (506) 336-2312. The Manager is Julien Mourant.

RIGHTS Peat Moss Lease No. 22 (202 ha) on Bog 353, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 353 is located 3 km southwest of Burnt Church, Northumberland County (Figure 19).

HISTORY The company acquired a Peat Exploration Licence in 1981 and converted to a Peat Moss Lease in 1983.

RESERVES AND GRADE 9.26 Mm^3 of surficial peat and 1.06 Mm^3 of humified peat on total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	90	237	327
> 1 m	67	188	255

DEVELOPMENT Nil.

Good Earth Canada Ltd.

COMPANY Good Earth Canada Ltd., 5960 Broadway, Lancaster, N.Y., U.S.A. Telephone: (716) 684-8111. The President is Guenter Burkhardt.

RIGHTS Peat Moss Lease No. 30 (734 ha) on Bog 338, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 338 is located at Point Escuminac, 50 km east of Chatham, Kent County (Figure 19).

HISTORY The company was issued a Peat Lease on March 1, 1986 following the cancellation of Peat Lease No. 21 (Gulf Peat Co. Ltd.) on January 31, 1986.

RESERVES AND GRADE 22.80 Mm^3 surficial peat and 7.09 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	559	291	850
> 1 m	501	164	665

DEVELOPMENT Site preparation included land clearing and excavation of drainage ditches.

Berger Mix Inc.

COMPANY Berger Mix Inc., 121, R. R. #1, St-Modeste, Cté Rivière-du-Loup, Québec G0L 3W0. The President is Claudin Berger. Telephone: (418) 862-4462.

RIGHTS Peat Exploration Licence 85-1 (681 ha) on Bog 337, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 337 is adjacent to Hwy 117, 2 km north of St-Camille, Kent County (Figure 19).

HISTORY In 1985, Berger Mix Inc. acquired a Peat Exploration Licence that was converted to a Peat Lease in 1986.

RESERVES AND GRADE 13.46 Mm^3 of surficial peat and 1.41 Mm^3 of humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	680	1	681
> 1 m	413	0	413

DEVELOPMENT Site preparation included land clearing and building an access road.

LIMESTONE/DOLOMITE[11]

Elmtree Resources Ltd. 21 O/9

(Sormany Limestone)

COMPANY Elmtree Resources Ltd., P. O. Box 665, Bathurst, New Brunswick E2A 3Z6. Telephone: (506) 546-6382. The Executive Officer and President is A. Buzas, and the Manager and Vice-President is G.M. Doucet.

RIGHTS 84.3 ha Quarry Lease No. 27 under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

163.5 ha Mining Licence No. 1345 and 16.2 ha Claim Block 993 under the Mining Act, Chapter M-14.1, S.N.B. 1985.

LOCATION This deposit is located about 30 km west of Bathurst, adjacent to the Millstream River (Figure 19).

HISTORY Although the limestones near Sormany were first mapped by Davies in 1959, it was not until 1982 that Elmtree Resources Ltd. mapped and sampled the deposit in detail. Two holes were drilled to further test the extent and grade continuity of the limestone at depth. Results were encouraging enough to proceed with site preparation for quarry development.

PRESENT OWNERSHIP Elmtree Resources Ltd.

RESERVES AND GRADES Results indicated an excess of 4 000 000 t of high-grade calcic limestone (53.0% CaO) suitable for quicklime and hydrated lime production.

PRODUCTION Some stone was quarried and hauled to the main crushing facility at Elmtree, where it was marketed as ag lime and smelter flux (see Elmtree Resources Ltd., below).

DEVELOPMENT In 1986, some stone was hauled to the crushing facility at Elmtree where it was marketed as ag lime.

EMPLOYEES Manpower was provided by staff of Elmtree Resources Ltd.

Elmtree Resources Ltd. 21 P/12W

(Armstrong Brook Dolomite)

COMPANY Elmtree Resources Ltd., P. O. Box 665, Bathurst, New Brunswick E2A 3Z6. Telephone: (506) 546-6382. The Executive Officer and President is A. Buzas, and the Manager and Vice-President is G.M. Doucet.

RIGHTS 59.10 ha Quarry Lease No. 26 under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

161.1 ha Mining Licence No. 1344, under the Mining Act, Chapter M-14.1, S.N.B. 1985.

LOCATION This dolomite deposit is located about 22 km west of Bathurst, Gloucester County (Figure 19).

HISTORY The deposit was found several years, perhaps decades, ago. It appears to have been used by local farmers, since the ruins of old kilns are present in the area. The deposit was rediscovered by Anaconda geologists in the 1950s while exploring for sulphide deposits. It was briefly investigated by J.W. McCarthy in the early 1970s and staked by Elmtree Resources Ltd. in 1982. An access road was constructed in 1983 and limited production for testing purposes was undertaken.

PRESENT OWNERSHIP Elmtree Resources Ltd.

RESERVES AND GRADE Exploration and development work by Elmtree Resources Ltd. has resulted in the delineation of more than 2 000 000 t of dolomite grading up to 37% $MgCO_3$.

PRODUCTION None.

DEVELOPMENT Plans to install additional crushing equipment for production of dolomitic ag lime and construction stone have been delayed.

EMPLOYEES Manpower was provided by the staff of Elmtree Resources Ltd.

Canada Cement Lafarge Ltd. 21 I/3W

(Havelock Limestone)

COMPANY The plant is operated by Canada Cement Lafarge Ltd., R.R.#1, Havelock, N.B. E0A 1W0. The Plant Manager is M. Shinners. The company's Atlantic Regional Office address is: Suite 310, Queens Square, 45 Alderney Drive, Dartmouth, N.S. B2Y 2N6. The Vice-President and General Manager (Atlantic Region) is J.A. Hemstock.

RIGHTS 632.5 ha Mining Licence No. 1217 (includes existing plant and all operating quarries) under the Mining Act, Chapter M-14.1, S.N.B. 1985.

LOCATION The new limestone quarry opened in 1986 is located just north of Highway 880, about 5 to 6 km east of Havelock, Westmorland County (Figure 19).

HISTORY This quarry was opened in an area known to contain extensive reserves of high-calcium limestone. The property was partially investigated in 1976; however, a recent more detailed drilling programme was undertaken to further verify the quality and extent of the deposit prior to the establishment of the new quarry site.

PRESENT OWNERSHIP Canada Cement Lafarge Ltd.

RESERVES AND GRADES Reserves are estimated in excess of 20 000 000 t of limestone grading 51% CaO or better.

PRODUCTION 1986 production was limited; the company has an agreement with Havelock Lime Works Ltd. (Dickenson Mines Ltd.) to supply up to 250 000 t of raw stone on a yearly basis.

DEVELOPMENT Some stone was sold to Havelock Lime Works Ltd.

EMPLOYEES 16 persons.

CHAPTER 4. PRODUCING MINES AND QUARRIES IN NEW BRUNSWICK

VALUE OF PRODUCTION[17]

The total value of minerals produced in New Brunswick as shown by preliminary figures for 1986 is $526 000 000, which is a 4.5% increase over the final figure of $502 203 000 for 1985 (Table 2). The decline in value of metals is more than offset by the increase is nonmetallics due to a full year of production from both potash mines in the Province (Table 3). The increase in structural materials is negated by the decline in the fuels group for 1986.

On a province-by-province basis in 1986, New Brunswick ranked first in antimony and bismuth; second in potash and peat; third in zinc, silver, lead, and sulphur in smelter gas; and fifth in coal, copper, salt and lime (Table 4).

The 1986 preliminary figures for the value of metals produced totalled $346 245 000, down from the final figure of $364 825 000 for 1985. Metals included in this group are antimony, bismuth, cadmium, copper, gold, lead, silver and zinc.

The 1986 value for nonmetallics (peat, potash, silica, salt, and sulphur in smelter gas) is $104 638 000, up from the 1985 final figure of $62 025 000. The large increase, as stated above, is due to a full year's production from both potash mines in the Sussex area.

Fuels (including coal, natural gas, and petroleum crude) decreased in value in 1986 to $26 728 000 from the 1985 final figure of $31 626 000. This decrease is due to the decline in oil price.

The value of structural materials increased slightly for 1986 to $48 389 000 from the 1985 final figure of $43 727 000. These commodities include clay products, cement, lime, sand, gravel, and stone. (Figure 21)

The mineral industry contributes greatly to New Brunswick's economy, second to the forest industry, and will continue to do so as more mining properties come into production. An increase in metal prices over the next few years could bring dormant projects into production. Figure 22 shows the location of the nonrenewable resource producers in the Province.

EMPLOYMENT[17]

Direct employment in the mineral industry for 1986 was 4096, down from the 1985 figure of 4374. This reduction was brought about by companies attempting to reduce operating costs in order to remain competitive on the metal markets.

Table 2.
Mineral Production
New Brunswick
1986

Preliminary Estimate

METALS	Units	Quantity	Value ($)
Antimony	kg	---	20 444 000
Bismuth	kg	174 000	1 625 000
Cadmium	kg	52 000	199 000
Copper	kg	7 069 000	14 427 000
Gold	g	107 000	1 757 000
Lead	kg	76 391 000	51 454 000
Silver	kg	201 000	51 031 000
Zinc	kg	166 107 000	205 308 000
TOTAL			346 245 000
NONMETALLICS			
Peat	t	191 000	18 440 000
Potash	t	---	68 637 000
Silica*	t	---	2 700 000
Salt	t	---	5 430 000
Sulphur (in smelter gas)	t	101 000	9 431 000
TOTAL			104 638 000
FUELS			
Coal	t	480 000	26 700 000
Natural Gas	m^3	1 000 000	15 000
Petroleum Crude	m^3	---	13 000
TOTAL			26 728 000
STRUCTURAL MATERIALS			
Clay products		---	3 350 000
Cement		---	8 406 000
Lime**		---	8 857 000
Sand and Gravel	t	8 200 000	16 702 000
Stone	t	2 030 000	11 074 000
TOTAL			48 389 000
GRAND TOTAL 1986 (Preliminary)			$526 000 000

* Formerly reported as "Quartz"
** Includes all limestone products except aggregate

Table 3.

Mineral Production in New Brunswick
1975 to 1986

Calendar Year	Metals ($)	Nonmetals ($)	Fuels ($)	Structural Materials ($)	Total ($)
1975	197 230 888	6 252 923	7 473 197	20 965 912	231 922 920
1976	195 340 976	7 163 466	5 988 243	30 090 493	238 583 178
1977	238 583 350	10 037 550	6 333 791	34 439 352	289 394 043
1978	281 770 379	11 467 716	8 811 135	37 670 743	339 719 973
1979	419 123 591	11 658 369	10 394 844	38 510 412	479 687 216
1980	302 674 000	13 192 293	17 282 186	40 981 000	374 129 479
1981	452 580 000	16 666 976	23 325 535	39 769 000	532 341 511
1982	409 832 000	20 587 126	24 630 614	43 241 000	498 290 740
1983	421 281 000	19 220 800	29 707 000	38 385 000	508 593 800
1984	497 981 000	47 973 438	29 837 000	42 178 000	617 969 438
1985	364 825 000	62 025 000	31 626 000	43 727 000	502 203 000
1986(P)	346 245 000	104 638 000	26 728 000	48 389 000	526 000 000

The various sectors show the following employment figures for 1986: Metals - 2280; Potash - 787; Coal - 254, Peat - 650; and Structural Materials - 125.

Scientific, technical, administrative and casual personnel employed by the Province in support of mineral resource development totalled 52 during 1986.

METALLIC MINERALS[8]

Brunswick Mining and Smelting Corporation Limited 21 P/5W

Brunswick operates one mine (No. 12), a concentrator, a lead smelter and a fertilizer plant.

LOCATION: The Brunswick No. 12 mine is located about 24 km west of Bathurst in Gloucester County (Lat. 47°28.5'N and Long. 65°53.5'W). The concentrator is adjacent to No. 12 mine (Figure 22). The lead smelter is located at Belledune Point, about 45 km from the No. 12 mine.

Table 4.

Rank of Provinces and Territories, in Value of Production
for Leading Minerals in Canada, 1986 (p)

Mineral	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Total Value Canada ($ millions)
Petroleum, Crude				7		6	5	2	1	3		4	9 719
Natural Gas				6		4		3	1	2		5	6 743
Coal			3	5				4	2	1			1 716
Copper				5	4	2	3	6		1	7	8	1 567
Zinc	8			3	7	1	5	9		4	6	2	1 304
Gold				7	2	1	6	9	8	4	5	3	1 715
Cement	8		6	9	2	1	5	7	3	4			791
Potash				2				1					579
Sand and Gravel	9	12	7	8	4	1	5	6	2	3	10	11	597
Stone	8		4	6	2	1	5		7	3		9	426
Silver				3	5	1	6	8		2	4	7	310
Salt			4	5		1		2	3				242
Lead				3		5	6			1	4	2	204
Clay Products	9		5	7	2	1	8	6	3	4			180
Lime				5		1	4		2	3			206
Molybdenum					2					1			114
Gypsum	3		1			2	5			4			81
Sulphur, in Smelter Gas				3	5	1	6	8		2	7	4	67
Peat	8		6	2	1	7	3	5	4	9			75
Quartz	6		8	7	1	2	4	9	3	5			43
Cadmium				6	5	1	4	7		2	8	3	5
Antimony				1						2			24
Bismuth				1		3	5			2	4	3	2

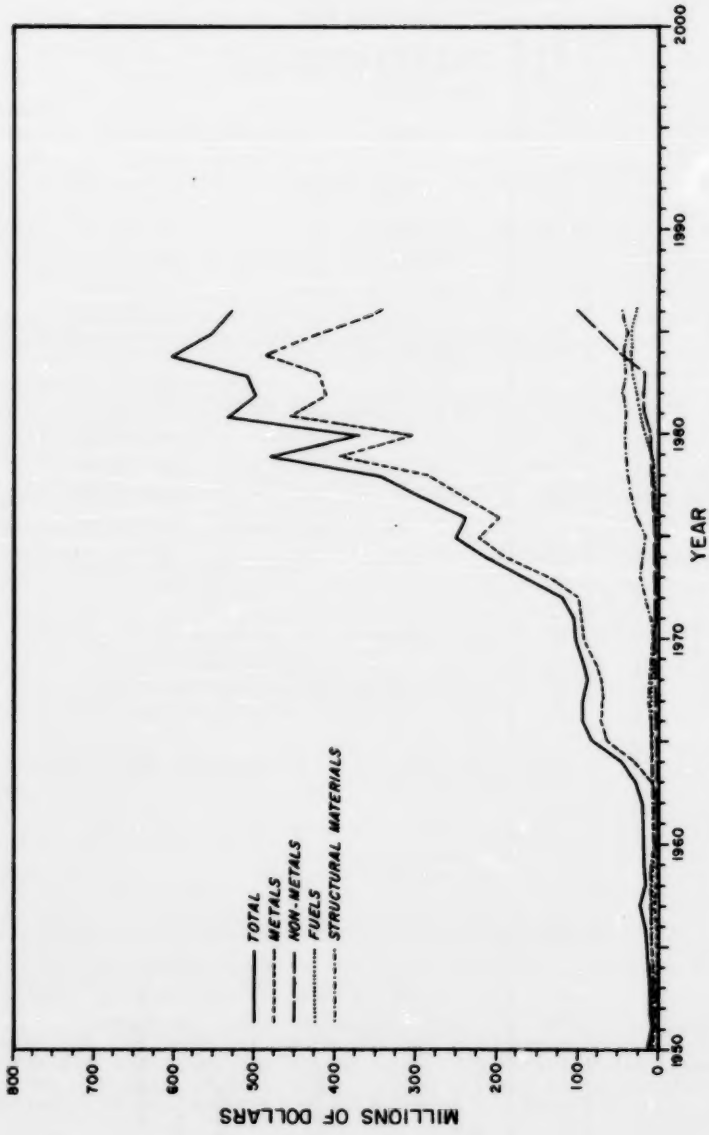


Figure 21. Value of mineral production in New Brunswick, 1950-1986.

HISTORY: The presence of sulphides was noted in 1907; however, drilling of ground electromagnetic targets in 1952 located the No. 6 mine. Investigation of another electromagnetic anomaly on strike pinpointed the site of the No. 12 mine in 1953. The property was granted to Brunswick Mining and Smelting Corporation Limited, which was controlled at that time by St. Joseph's Lead Company. During the period 1953-57, an open pit and pilot mill were constructed at the No. 6 location. In 1961, interest was transferred to M.J. Boylen, K.C. Irving, and Patino Corporation. Development commenced at No. 12 in 1962 and mine production began in 1964. Production began at the No. 6 mine in 1966. In 1967, Noranda invested $50 000 000 and gained control of Brunswick Mining and Smelting Corporation Limited. Noranda proposed a $50 000 000 expansion, which was started in 1974 and completed in 1981. A total capital expenditure of $69 000 000 was made at the mine and smelter between 1979 and 1981.

In 1985, the adjoining Belledune Fertilizer plant, which produces a diammonium phosphate fertilizer product using sulphuric acid produced by the smelter, was purchased by Brunswick Mining and Smelting Corporation Limited. In 1986, Brunswick Mining commenced work to deepen its No. 3 shaft 244 m.

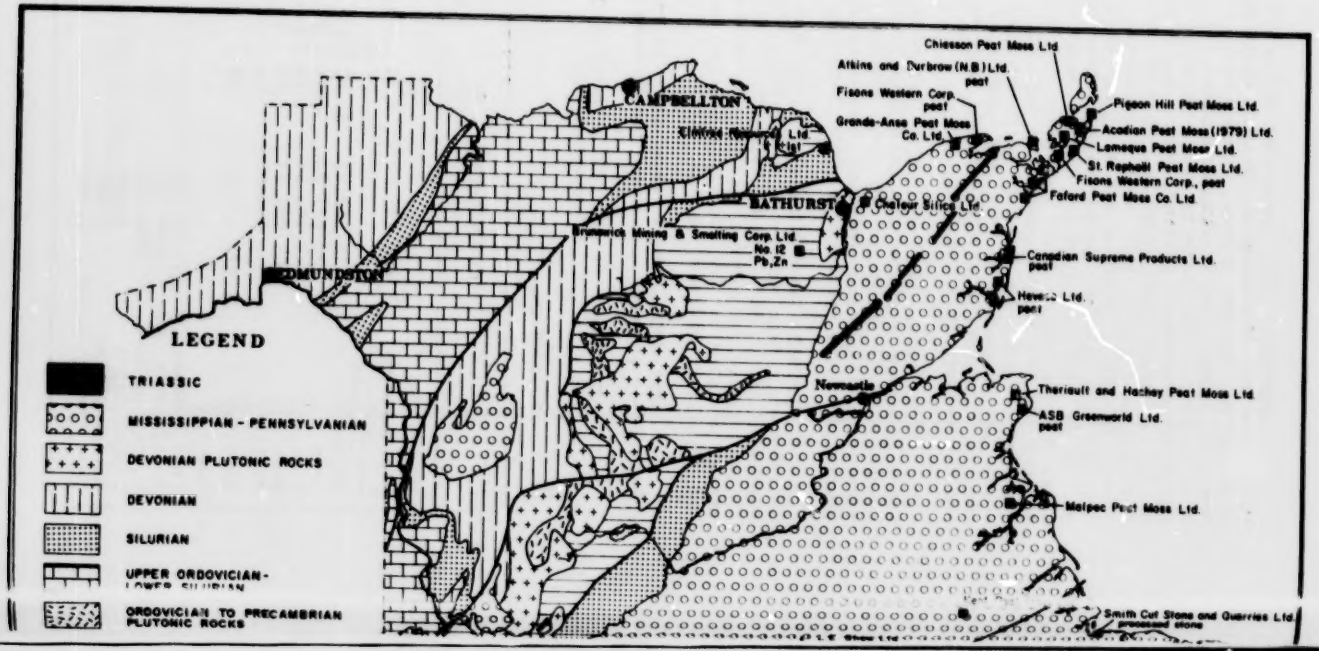
COMPANY Head Office - P. O. Box 45, Commerce Court W., Toronto; Mine Office - P. O. Box 3000, Bathurst; Smelter Officer - P. O. Box 2000, Belledune. The President is J.C. White; Senior Vice-President is J.W. Moerman; Manager of the Mining Division is J.R. Schnarr; General manager of the Smelter and Fertilizer Division is M.D. Street.

EMPLOYEES There were 1502 persons employed at the mine and 558 persons at the smelter in 1986.

RESERVES 101 404 000 t grading 0.33% Cu, 3.60% Pb, 8.84% Zn and 96.4 g/t Ag (December, 1986).

PRODUCTION

	Production (t)	Cu (%)	Pb (%)	Zn (%)	Ag (g/t)
MILLED ORE					
(No. 12 mine)	3 408 645.00	0.34	3.45	8.73	99
CONCENTRATE					
Copper	32 142.02	20.80	7.52	3.43	2 641
Lead	206 041.82	.44	32.54	4.57	467
Zinc	413 796.34	.32	1.89	50.48	92
Bulk	85 063.64	.56	16.43	34.19	310
Pyrite	385.37	.91	2.88	12.68	366
TAILINGS	2 671 215.81	.09	1.09	1.78	37
SMELTER					
Lead (metal)	59 005				
Silver dore (kg)	93 152				
Sulphuric acid	166 474				
Copper matte	3 280				
Antimony slag	4 630				
Lead-bismuth alloy	1 806				


Chiasson Peat Moss Ltd
Atkins and Purbrow (N.B.) Ltd. peat
Fisons Western Corp. peat
Granda-Anse Peat Moss Co. Ltd.
Pigeon Hill Peat Moss Ltd.
Acadian Peat Moss (1979) Ltd.
Lameque Peat Moor Ltd.
St. Raphaël Peat Moss Ltd.
Fisons Western Corp., peat
Paford Peat Moss Co. Ltd.
CAMPBELLTON
BATHURST
Brunswick Mining & Smelting Corp. Ltd. No. 12 Pb, Zn
Chaleur Silica Ltd.
Canadian Supreme Products Ltd. peat
Newcastle
Theriault and Hachey Peat Moss Ltd.
ASB Greenworld Ltd. peat
Malpec Peat Moss Ltd.
Smith Cut Stone and Guerriss Ltd. processed stone
EDMUNDSTON
LEGEND
TRIASSIC
MISSISSIPPIAN - PENNSYLVANIAN
DEVONIAN PLUTONIC ROCKS
DEVONIAN
SILURIAN
UPPER ORDOVICIAN-
ORDOVICIAN TO PRECAMBRIAN PLUTONIC ROCKS

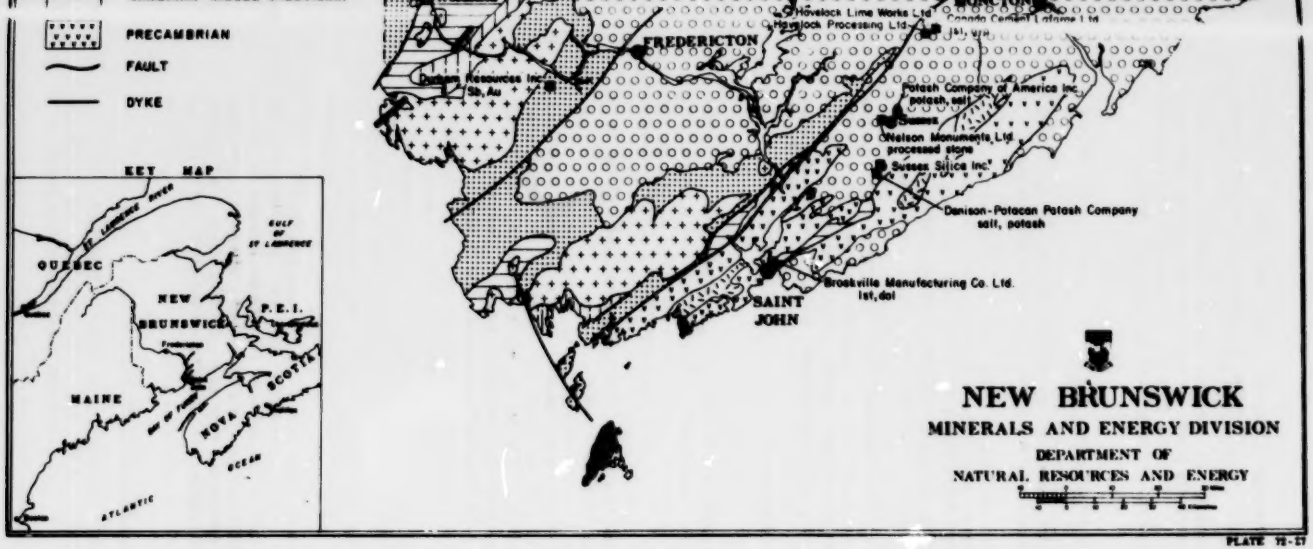


Figure 22. Nonrenewable resource producers in New Brunswick in 1986.

DEVELOPMENTS Brunswick Mining and Smelting Corporation Limited lost $6 900 000 in 1986 as a result of continuing low metal prices. After implementing tough cost-cutting measures in 1986, the company is expecting a profit in 1987. The company will save $4 000 000 as a result of early retirement and severance packages; $2 000 000 as a result of reduced shipping costs; and $1 000 000 through energy-saving methods.

Durham Resources Inc. 21 G/14E

LOCATION The Lake George antimony mine is situated about 15 km north of Harvey Station, York County (Figure 22).

HISTORY Antimony sulphide was first discovered on the property in 1863. There was minor production between 1880 and 1884. The first major development that led to production occurred in 1969-1971. The mine produced until 1981 when it ran out of known reserves.

COMPANY The mine is owned by Oakwood Petroleums Ltd. and operates under the name of Durham Resources Inc. with head offices at 111 Richmond Street West, Suite 916, Toronto, Ontario M5H 2G4. Chairman and President of Durham Resources Inc. is R. Granger. The Executive Vice-President and Chief Operating Officer is H. Harbinson; the Mine Manager is B. Bourgoin.

EMPLOYEES There were 91 persons employed on the site in 1986.

RESERVES 747 528 t at 4.03% Sb (December, 1986).

PRODUCTION Production in 1986 was 95 254 t of ore yielding 4362 t of antimony concentrate.

DEVELOPENTS: Shaft development was completed in June 1985. The mine, with 11 stopes in production, operated without interruption in 1986. As with most metals, antimony prices remained relatively low during the year. There are no substantial changes in mill throughput planned for 1987.

NONMETALLIC MINERALS[11,12]

PEAT[12]

Fifteen companies were engaged in the production of peat moss in 1986 (Figure 22). Canadian Supreme Products Ltd. purchased Portage Peat Moss Ltd. Favourable weather in New Brunswick combined with adverse weather conditions in other peat-producing regions resulted in record shipment levels in 1986.

Peat Shipments

Year	Bale Equivalents*
1982	3 035 000
1983	3 900 000
1984	4 062 000
1985	4 086 000
1986	6 099 448

*Bale equivalent = 0.170 m^3 of peat compressed at a ratio of 2:1, and having a 50% moisture content.

Acadian Peat Moss (1979) Ltd.

COMPANY Acadian Peat Moss (1979) Ltd., P. O. Box 240, Lamèque, New Brunswick E0B 1V0. Telephone: (506) 344-2225. The President is Elphege Chiasson; the Manager is Jean-Marc Savoie.

RIGHTS Peat Moss Lease No. 13 (232 ha) on Bog 568 under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 568 is adjacent to the Coteau Road on Lamèque Island, Gloucester County (Figure 22).

HISTORY Established in 1965, the company originally produced block-cut peat, but now also produces milled peat. Following a disastrous fire in 1981 the company resumed full production in 1982.

PRESENT OWNERSHIP Acadian Peat Moss (1979) Ltd.

RESERVES AND GRADE 7.33 Mm^3 surficial peat and 3.41 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	206	134	340
> 1 m	198	66	264
In Production	128	16	144

PRODUCTION The company has an annual production capacity of 320 000 bale equivalents.

EMPLOYEES 1986 - 6 to 54 persons.

DEVELOPMENT Continued expansion of existing lease. Production from Bog 567, held under lease by Chiasson Peat Moss Ltd., is usually included in production figures since the only bagging facilities are located at Bog 568.

ASB Greenworld Ltd.

COMPANY ASB Greenworld Ltd., Pointe Sapin, Kent County, New Brunswick E0A 2A0. Telephone: (506) 876-3937. The Manager is Andreas Avenriep.

RIGHTS Peat Moss Lease No. 19 (627 ha) on Bog 324E, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 324E is located 1 km northwest of Pointe Sapin in Kent County (Figure 22).

HISTORY The company commenced site preparation in 1978 prior to acquiring a lease in 1982.

PRESENT OWNERSHIP ASB Greenworld Ltd.

RESERVES AND GRADE 57.29 Mm^3 surficial peat and 12.26 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	1591	386	1977
> 1 m	1360	183	1543
In Production	130	32	162

PRODUCTION The company produces baled peat and peat-soil mixes, and has an annual production capacity of 360 000 bale equivalents.

DEVELOPMENT The company continued to work toward increasing the ratio of soil mixes to baled peat.

EMPLOYEES 1986 - 8 to 45 persons.

Atkins and Durbrow (N.B.) Ltd.

COMPANY Atkins and Durbrow (N.B.) Ltd., P. O. Box 88, Bas-Caraquet, Gloucester County, New Brunswick E0B 1E0. Telephone: (506) 727-3385. The Manager is Eino Kivipato.

RIGHTS Peat Moss Lease No. 7 (202 ha) on Bog 600, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 600 is located on Pokesudie Island (Figure 22).

HISTORY The company has been producing peat since 1886, but first commenced production in New Brunswick in 1965. Following a disastrous fire in 1978, the operation was rebuilt and production was resumed in late 1980.

PRESENT OWNERSHIP Atkins and Durbrow (N.B.) Ltd.

RESERVES AND GRADE 2.2 Mm^3 surficial peat and 1.38 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	179	215	394
> 1 m	128	22	150
In Production	113	1	114

PRODUCTION The company produces baled peat and has an annual capacity of 110 000 bale equivalents.

DEVELOPMENT Continued peat production.

EMPLOYEES 1986 - 1 to 26 persons

Chiasson Peat Moss Ltd.

COMPANY Chiasson Peat Moss Ltd., P. O. Box 112, Lamèque, New Brunswick E0B 1V0. Telephone: (506) 344-2426. The President is Elphege Chiasson; the Manager is Gilles Haché.

RIGHTS Peat Moss Lease No. 23 (76 ha) on Bog 567 under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 567 is located 3 km southeast of Little Shippegan (Figure 22).

HISTORY The company acquired an Exploration Licence in 1982 and converted to a lease in the same year.

PRESENT OWNERSHIP Chiasson Peat Moss Ltd.

RESERVES AND GRADE 2.21 Mm^3 surficial peat and 1.06 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	65	38	103
> 1 m	53	21	74
In Production	50	20	70

PRODUCTION The company produces baled peat at an annual production capacity directly related to that of Acadian Peat Moss (1979) Ltd. The product is presently baled at the Acadian Peat Moss (1979) Ltd. facility owned by the same principals.

DEVELOPMENT Baled peat production was continued.

Fafard Peat Moss Co. Ltd.

COMPANY Fafard Peat Moss Co. Ltd., P. O. Box 70, Shippagan, Gloucester County, New Brunswick. Telephone: (506) 336-2325. The Manager is René Martin.

RIGHTS Peat Moss Lease Nos. 4 (364 ha), 5 (506 ha) and 6 (607 ha) under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION All bogs are in Gloucester County (Figure 22).

Lease	Bog No.	Size (ha)	Location
4	530	364	Pokemouche Bog, off Route 113 at Inkerman
5	532	506	Six Road Bog, 15 km south of Shippagan
6	529	607	Inkerman Ferry Bog, 8 km southwest of Shippagan

HISTORY The company commenced production at Bog 530 in 1941 producing block-cut, hand-cut peat. Similarly, block-cut peat was produced from Bog 532 until the company began producing milled peat in 1966. The company commenced mechanized block-cut peat production in 1971, but then ceased all block-cut operations in 1977. Presently, only milled peat is produced from three bogs.

PRESENT OWNERSHIP Fafard Peat Moss Co. Ltd.

RESERVES AND GRADE

Bog No.	Surficial (Mm^3)	Humified (Mm^3)
529	7.80	14.59
530	8.15	3.22
532	11.49	6.77

Bog areas include the following:

	Crown (ha)	Freehold (ha)	Total (ha)
Bog 529			
Total Bog	663	311	974
> 1 m	468	140	608
In Production	113	3	116
Bog 530			
Total Bog	416	67	483
> 1 m	387	41	428
In Production	120	12	132
Bog 532			
Total Bog	370	206	576
> 1 m	360	134	494
In Production	274	50	324

PRODUCTION The company produces baled peat and peat mixes and has an annual capacity of 1 250 000 bale equivalents.

DEVELOPMENT Continued to develop the remaining potential on Bogs 529 and 532. Sections of Bog 530 that were originally hand cut have been abandoned.

EMPLOYEES 1986 - 6 to 74 persons.

Fisons Western Corporation

COMPANY Fisons Western Corp., Maisonnette, New Brunswick E0B 1X0. Telephone: (506) 727-3428. The Manager is Edward Puhacz.

RIGHTS Peat Moss Lease No. 10 (1724 ha) and No. 12 (396 ha) under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION (Figure 22)

Lease	Bog No.	Location
10	591	2 km south of Lamèque
	592	4 km southeast of Lamèque
12	562	6 km west of Lamèque at Maisonnette
26	527	1 km south of centre of Shippagan

HISTORY In 1929, Western Peat Company Limited (the forerunner of Western Peat Moss Ltd.) commenced operations on a small sphagnum bog in Whalley, British Columbia. In 1963, the original shareholders sold their interests in Western to an American company, Red Wing Peat Corporation. Western became the Canadian producing company, and Red Wing assumed the responsibility for marketing the company's products in the United States. In 1964, following up work that had begun earlier, a base of operations was established at Maisonnette (Bog 562). In 1970, Red Wing established a second base of operations in New Brunswick when it purchased Atlantic Peat Moss Co. Ltd. at Shippagan. Atlantic had produced from Bog 527 (1953-1971) and from Bog 591 since 1952. In 1974, S.B. McLaughlin Associates Limited of Toronto, Ontario purchased the holdings of the major shareholder, Red Wing, and assumed control. This was followed by the combination of the business operations of Western and Atlantic into Western Peat Moss Limited. In 1980, Fisons, a British company, acquired a 50% interest in Western Peat Moss Limited. The joint venture company was renamed Fisons Western Peat Moss Limited and then changed to Fisons Western Corporation in January 1982, when Fisons acquired the remaining McLaughlin interests. Bog 527 was abandoned in 1971 due to fire hazard to the town of Shippagan and converted to Peat Lease 26 in 1984. The new plant on Lamèque Island (Bog 591) opened in 1981.

PRESENT OWNERSHIP Fisons Western Corporation

RESERVES AND GRADE

Bog No.	Surficial (Mm^3)	Humified (Mm^3)
527	7.56	3.32
591	30.70	14.81
592	9.40	4.59
562	9.65	3.53

Bog areas include the following:

	Crown (ha)	Freehold (ha)	Total (ha)
Bog 527			
Total Bog	315	290	605
> 1 m	240	137	377
Bog 591			
Total Bog	978	256	1234
> 1 m	909	151	1060
In Production	288	55	343
Bog 592			
Total Bog	365	224	589
> 1 m	318	82	400
In Production			
Bog 562			
Total Bog	373	168	541
> 1 m	331	48	379
In Production	288	51	339

PRODUCTION The company produces baled peat and has an annual production capacity of 1 500 000 bale equivalents.

DEVELOPMENT Development continued on Bog 591, eventually leading to development of Bog 592.

EMPLOYEES 1986 - 3 to 30 persons

Grande-Anse Peat Moss Co. Ltd.

COMPANY Grande-Anse Peat Moss Co. Ltd., P. O. Box 90, Grande-Anse, Gloucester County, New Brunswick E0B 1R0. Telephone: (506) 732-2854. The President is Paul Tocci; the Manager is Patricia Whelton.

RIGHTS Peat Moss Lease No. 8 (166 ha) on Bog 561, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 561 is located 3 km southeast of Grande-Anse (Figure 22).

HISTORY The company started block-cut peat operations in 1961 by hand cutting, but converted to mechanization in 1966. The conversion to milled peat began in 1977.

PRESENT OWNERSHIP Grande-Anse Peat Moss Co. Ltd.

RESERVES AND GRADE 4.13 Mm^3 surficial peat and 2.98 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	137	188	325
> 1 m	118	125	243
In Production	114	77	191

PRODUCTION Company produces baled peat and peat mixes and has an annual production capacity of 170 000 bale equivalents.

DEVELOPMENT Continued production.

EMPLOYEES 1986 - 8 to 35 persons.

Heveco Ltd.

COMPANY Heveco Ltd., P. O. Box 30, Tabusintac, Northumberland County, New Brunswick E0C 2A0. Telephone: (506) 779-9277. The Manager is Myles Wishart.

RIGHTS Peat Moss Lease No. 9 (1080 ha) and No. 24 (1740 ha) under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 522 (Lease 24) is 2 km east of Brantville and Bog 524 (Lease 9) is 2 km southeast of Tabusintac (Figure 22).

HISTORY The company, incorporated in 1962, produces block-cut peat and peat mixes. Milled peat production commenced in 1981.

PRESENT OWNERSHIP Heveco Ltd.

RESERVES AND GRADE

Bog No.	Surficial (Mm^3)	Humified (Mm^3)
522	4.26	1.56
524	38.00	10.69

Bog areas include the following:

	Crown (ha)	Freehold (ha)	Total (ha)
Bog 522			
Total Bog	164	29	193
> 1 m	145	16	161
In Production	--	--	--
Bog 524			
Total Bog	909	327	1 236
> 1 m	841	287	1 128
In Production	248	37	285

Bog 524 has numerous lakes throughout, which have caused drainage problems and thus reduced the area in production.

PRODUCTION The company produces block-cut peat and peat mixes and has an annual production capacity of 400 000 bale equivalents.

DEVELOPMENT Continued production from Bog 524.

EMPLOYEES 1986 - 3 to 61 persons.

Lamèque Peat Moss Ltd.

COMPANY Lamèque Peat Moss Ltd., P. O. Box 570, Lamèque, New Brunswick E0B 1V0. Telephone: (506) 344-2293. The Manager is Florent Chiasson.

RIGHTS Peat Moss Lease No. 14 (142 ha) on Bog 580 and Peat Moss Lease No. 28 (104 ha) on Bog 578, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 580 is 4 km north of Lamèque and Bog 578 is 2 km north of Petite-Lamèque, both in Gloucester County (Figure 22).

HISTORY The company, established in 1971, is producing milled peat.

PRESENT OWNERSHIP Lamèque Peat Moss Ltd.

RESERVES AND GRADE 7.09 Mm^3 of surficial peat and 2.27 Mm^3 of humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Bog 580			
Total Bog	130	91	221
> 1 m	120	50	170
In Production	100	7	107
Bog 578			
Total Bog	63	22	85
> 1 m	45	11	56
In Production	--	--	--

PRODUCTION The company produces milled peat and has an annual production capacity of 135 000 bale equivalents.

DEVELOPMENT Lamèque Peat Moss Ltd. continues to develop the Crown portion of the bog to its full potential. A Peat Moss Lease was obtained for Bog 578.

EMPLOYEES 1986 - 4 to 36 persons.

Pigeon Hill Peat Moss Ltd.

COMPANY Pigeon Hill Peat Moss Ltd., P. O. Box 639, Lamèque, New Brunswick E0B 1V0. Telephone: (506) 344-2440. The President is Edmond Chiasson.

RIGHTS Peat Moss Lease No. 18 (234 ha) on Bog 569 under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 569 is located at Pigeon Hill on Lamèque Island, Gloucester County (Figure 22).

HISTORY Company acquired a Peat Moss Lease in 1979.

PRESENT OWNERSHIP Pigeon Hill Peat Moss Ltd.

RESERVES AND GRADE 3.62 Mm^3 surficial peat and 2.17 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	250	40	290
> 1 m	196	30	226
In Production	50	0	50

PRODUCTION The company produces milled peat and has an annual rated capacity of 110 000 bale equivalents.

DEVELOPMENT Pigeon Hill Peat Moss Ltd. continued to expand production fields as the market dictates.

EMPLOYEES 1986 - 1 to 15 persons.

Canadian Supreme Products Ltd.

COMPANY Canadian Supreme Products Ltd., P. O. Box 570, Lamèque, N.B. EOB 1VO. Telephone: (506) 344-2293. The manager is Laurie Chiasson.

RIGHTS Peat Moss Lease No. 16 (272 ha) on Bog 517, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 517 is located 1.5 km east of Portage River, Northumberland County (Figure 22).

HISTORY Portage Peat Moss Ltd. started commercial production in 1972. In 1985, Canadian Supreme Products Ltd., a "sister" company of Lamèque Peat Moss Ltd., acquired the operation.

PRESENT OWNERSHIP Canadian Supreme Products Ltd.

RESERVES AND GRADE 6.17 Mm^3 surficial peat and 1.03 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	243	9	252
> 1 m	150	1	151
In Production	86	0	86

PRODUCTION The company has an annual production capacity of 190 000 bale equivalents.

DEVELOPMENT The bog continued to be developed at a rate consistent with market demand.

EMPLOYEES 1986 - 3 to 27 persons.

St-Raphäel Peat Moss Ltd.

COMPANY St-Raphäel Peat Moss Ltd., P. O. Box 570, Haut-Lamèque, New Brunswick E0B 1V0. Telephone: (506) 344-8530. The Secretary-Treasurer is Florent Chiasson.

RIGHTS Peat Moss Lease No. 17 (115 ha) on Bog 576, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 576 is 4 km east of Haut-Lamèque, Lamèque Island (Figure 22).

HISTORY Peat Moss Lease No. 17 was acquired in 1977.

PRESENT OWNERSHIP St-Raphäel Peat Moss Ltd. is a 'sister' company of Lamèque Peat Moss Ltd.

RESERVES AND GRADE 3.65 Mm^3 surficial peat and 1.93 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	113	104	217
> 1 m	105	35	140
In Production	105	25	130

PRODUCTION Company has an annual production capacity of 165 000 bale equivalents. Produces baled peat.

DEVELOPMENT Continued peat production with bog operating at capacity.

EMPLOYEES 1986 - 4 to 37 persons.

Theriault and Hachey Peat Moss Ltd.

COMPANY Theriault and Hachey Peat Moss Ltd., R.R.#1, Baie-Sainte-Anne, Northumberland County, New Brunswick E0C 1A0. Telephone: (506) 228-4530. The President is Isaac Theriault; the Vice-President is Gary Williston.

RIGHTS Peat Moss Lease No. 11 (332 ha) on Bog 324W and Peat Moss Lease No. 27 (125 ha) on Bog 302A under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 324W is located 6 km south of Eel River Bridge and Bog 302A is located 7 km south of Eel River Bridge, both in Northumberland County (Figure 22).

HISTORY The company was formed in 1963, but block-cut peat had been produced from the site since 1961. In 1977 the block-cutting operation was converted to a milled peat operation. The company acquired the Peat Moss Lease on Bog 302A in 1985.

PRESENT OWNERSHIP Theriault and Hachey Peat Moss Ltd.

RESERVES AND GRADE 75.43 Mm^3 of surficial peat and 18.13 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Bog 324W			
Total Bog	2 858	181	3039
> 1 m	2 340	51	2391
In Production	90	2	92
Bog 302A			
Total Bog	233	Nil	233
> 1 m	145	Nil	145
In Production	--	--	--

PRODUCTION The company has an annual production capacity of 200 000 bale equivalents.

DEVELOPMENT Theriault and Hachey Peat Moss Ltd. is attempting to open up new production fields.

EMPLOYEES 1986 - 2 to 33 persons.

Kent Peat Moss Ltd.

COMPANY Kent Peat Moss Ltd., R. R. #2, Saint-Paul, Kent County, New Brunswick E0A 2B0. Telephone: (506) 955-3098. The Manager is Eloi Maillet.

RIGHTS Peat Moss Lease No. 25 (393 ha) on Bog 41, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 41 is located 0.6 km west of Birch Ridge, Kent County (Figure 22).

HISTORY The company acquired a Peat Exploration Licence in 1982 and converted to a Peat Moss Lease in 1983.

PRESENT OWNERSHIP Les Equipements Tardif Inc., 55, R. R. #1, St-Antonin, Rivière-du-Loup, Québec G0L 2J0. Telephone: (506) 862-7574. The President is Léonard Tardif.

RESERVES AND GRADE 4.76 Mm^3 surficial peat and 2.18 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	264	80	344
> 1 m	163	53	216
In Production	100	--	100

PRODUCTION The company plans to achieve an annual rated capacity of 250 000 bale equivalents.

DEVELOPMENT Part of the bog was drained in 1983 and production commenced in 1984. The company continued to expand the bog in 1986.

EMPLOYEES 1986 - 1 to 24 persons.

Malpec Peat Moss Ltd.

COMPANY Malpec Peat Moss Ltd., P. O. Box 118, Rexton, New Brunswick E0A 1L0. Telephone: (506) 523-9161. The President is Solomon Curry.

RIGHTS Peat Moss Lease No. 20 (249 ha) on Bog 213 under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 213 is located 3 km west of Rexton, Kent County (Figure 22).

HISTORY The company was issued a Peat Moss Lease in 1982. It commenced milled peat production in 1985.

PRESENT OWNERSHIP Malpec Peat Moss Ltd.

RESERVES AND GRADE 38.03 Mm^3 surficial peat and 5.0 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	1 777	488	2 265
> 1 m	1 274	73	1 347
In Production	100	Nil	100

PRODUCTION The company has an annual production capacity of 250 000 bale equivalents.

DEVELOPMENT Malpec Peat Moss Ltd. began production and continued development of Bog 213.

EMPLOYEES 1986 - 4 to 50 persons.

POTASH/SALT[11]

Potash Company of America, Inc. 21 H/11W, 14W

COMPANY Potash Company of America, Inc., P. O. Box 1489, Sussex, New Brunswick E0E 1P0. Telephone: (506) 433-5445. The Executive Officer and President is Peter Jack; the Mine Manager is Donald Roberts.

RIGHTS 19 187 ha Mining Lease, under Section 25(2) of the Mining Act, Chapter M-14.1, S.N.B. 1985.

LOCATION The Potash Company of America mine/mill facility is located about 5 km east of Sussex, Kings County, on the north side of Highway 2 (Figure 22).

HISTORY Following the discovery of potash in the Plumweseep-Penobsquis area by the New Brunswick Department of Natural Resources in 1971, exploration and development rights covering a 360 km^2 reservation area were granted to the Potash Company of America in 1973. After a comprehensive exploration programme and feasibility study, the company decided to proceed with the construction of a 5 m diameter exploratory mine shaft in the spring of 1978. The exploration shaft was

completed in April and underground exploration in October of 1980. On October 27, 1980 the Potash Company of America announced that it was proceeding to production with a mine capacity of 900 000 t/a although initial capacity will be 630 000 t/a.

Mine development, mill construction and the Courtenay Bay potash shipping terminal in Saint John were completed in 1983. The first potash was produced from the mill on July 17, 1983. The first shipment of potash through the port facility in Saint John took place early in 1984.

PRESENT OWNERSHIP Rio Algom Limited, 120 Adelaide St. W, Toronto, Ontario M5H 1W5.

RESERVES AND GRADE Sufficient tonnage has been indicated by drilling to support a 1 000 000 t/a plant for 20 years or more.

PRODUCTION Potash and salt production, which commenced in 1983, continued throughout 1986 although potash production is proceeding at a reduced capacity due to problems with excess brine production and backfilling of tailings underground. Salt production levels were maintained in excess of 400 000 t/a. Sales are handled by Iroquois Salt Products Ltd. under an agreement with PCA.

DEVELOPMENT After purchasing PCA early in 1986, Rio Algom Limited has committed over $30 000 000 to improvements designed to bring the Sussex mine up to its rated capacity of 635 000 product tonnes per year by April 1987. A considerable amount has been spent in the mine to improve the reliability and capacity of the conveyor systems. In the mill, PCA has been working toward improving equipment uptime and boosting potash recovery rates. Recovery rates have been low since start-up due to the relatively fine-grained nature of the ore. A new regrind ball mill was recently installed in the flotation circuit aiding in the liberation of fine-grained potash crystals, thereby improving recovery.

In the tailings handling system, a new A-frame 5080 t storage building was constructed providing temporary storage for tailings surges. This should be sufficient to store tailings produced over a 24-hour period, allowing sufficient lead time to correct mine-related tailings disposal problems that would normally have required the mill to shut down.

EMPLOYEES Average of 310 persons for 1986.

Denison-Potacan Potash Company

21 H/12E

COMPANY Denison-Potacan Potash Company, P. O. Box 5005, Sussex, New Brunswick E0E 1P0. Telephone: (506) 839-2146. The Chief Executive Officer is S. B. Roman. The General Manager is C.K. Benner.

RIGHTS 8.887 ha Mining Lease, under Section 25(2) of the Mining Act, Chapter M-14.1, S.N.B 1985.

LOCATION Denison-Potacan Potash Company is located about 20 km southwest of Sussex, Kings County (Figure 22).

HISTORY The Salt Springs potash-salt deposit was discovered by the Department of Natural Resources in 1973. Subsequent exploration and development rights to a 120 km^2 reservation area were granted to International Minerals and Chemical Corporation (IMC). Full-scale exploration (22 drill holes) began in 1975, and was successful in confirming a significant orebody.

Despite extremely encouraging results of the drilling programme, IMC decided to sell the property to Denison Mines Limited of Toronto late in 1978. Construction of a 5 m diameter exploration mine shaft was commenced in September 1979 and reached a target depth of 835 m by 1982.

In December 1980, Denison Mines Limited assigned a 40% interest to the Potash Company of Canada Limited (Potacan). Potacan is owned jointly by Entreprise Minière et Chimique, and Kali und Salz Ag. Denison Mines Limited remains the overall development manager, with potash sales to be handled by Potacan.

A feasibility study completed in 1982 resulted in a production decision announcement on February 7, 1983.

Work on the No. 2 shaft, the production shaft, commenced in 1983, along with continued underground development and the construction of the surface infrastructure related to the mill facility, tailings storage, and brine disposal. By July, 1985 all pre-production work was completed and the first shipment of potash destined for Colombia was made on September 17, 1985.

PRESENT OWNERSHIP 60% Denison Mines Ltd., 40% Potash Company of Canada (Potacan).

RESERVES AND GRADE Underground exploration in 1982 has blocked out more than 41 000 000 t of 28.5% K_2O, sufficient for the initial 5 years of production. Together with the 22 surface drill holes, the underground work to date has established total reserves of 230 000 000 t (proven and possible).

PRODUCTION Production commenced in July 1985 and is gradually building up toward the operation's annual rated capacity of 1 300 000 product tonnes.

DEVELOPMENT Emphasis was placed in bringing the mill up to its full design capacity of 780 000 t K_2O. An on-site product storage building with a capacity of 90 000 t was completed in 1986, providing temporary product storage during off-peak times during the fertilizer year.

EMPLOYEES An average of 400 persons in 1986.

LIMESTONE/DOLOMITE[11]

Brookville Manufacturing Company Ltd. 21 H/5

COMPANY Brookville Manufacturing Company Ltd., P. O. Box 2332, Saint John, New Brunswick E2L 3V6. The Executive Officer and President is R. H. Oland; the Mine Manager is M. Sanford.

RIGHTS Original King's Land Grant

LOCATION Brookville, East Saint John, Saint John County. The quarry and crushing operation is located between Highway 1 (Sussex-Saint John Highway) and Highway 100 (Rothesay Highway), approximately 2 km east of their junction. Access to the quarry is via the Rothesay Highway (Figure 22).

HISTORY The company commenced operations more than 60 years ago, primarily producing agricultural limestone and aggregate. It has been operating almost continuously since.

PRESENT OWNERSHIP R.H. Oland (Moosehead Breweries Ltd.).

RESERVES AND GRADE At present market levels, adequate reserves of stone are estimated for at least 10 years. Although grade varies between areas of high-calcium limestone and dolomite throughout the quarry, the bulk of production is centred in the more dolomitic areas where grades fluctuate from 40 to 45% $MgCO_3$.

PRODUCTION The company produces agricultural dolomitic limestone, concrete, asphaltic aggregate and road metal (200 000 to 225 000 t annually for the past 5 years).

DEVELOPMENT Continued operation.

EMPLOYEES 28 persons (average number).

LIMESTONE/GYPSUM[11]

Canada Cement Lafarge Ltd. 21 I/3W

COMPANY Canada Cement Lafarge Ltd. The plant address is R. R. #1, Havelock, New Brunswick E0A 1W0. Telephone: (506) 534-2301. The Manager is M. Shinners.

RIGHTS 632.5 ha Mining Licence No. 1217 (includes existing plant and operating quarries); 205.5 ha Mining Licence No. 1168 (Springhill property); 302.7 ha Mining Licence No. 1090 (Intervale property). All Mining Licences are under the Mining Act, Chapter M-14.1, S.N.B. 1985.

LOCATION The limestone quarries and plant are located on Highway 880, about 5 km east of Havelock, Westmorland County (Figure 22).

The gypsum quarry is located less than 5 km north of Petitcodiac, Westmorland County.

HISTORY The limestone quarry near Havelock has been supplying raw material to the nearby cement plant since 1952. In 1983, the company announced plans to scale down its cement production at Havelock due to depressed market conditions. The operation of the cement kiln was subsequently suspended, but the grinding plant continued operation on a demand basis from stockpiles of clinker built up before the shutdown, as well as from clinker brought in periodically from a plant in Nova Scotia.

Initial quarrying of gypsum at Intervale began in 1880. The Albert Manufacturing Co. produced 1179 t/a, between 1932 and 1935. In 1950, the property was acquired by Canada Cement Co. Ltd. who has worked the quarry periodically, supplying gypsum to the cement plant at Havelock.

PRESENT OWNERSHIP Canada Cement Lafarge Ltd.

RESERVES AND GRADE Reserves of high-grade limestone (i.e., 53% CaO) on properties held under Mining Licence by Canada Cement have been estimated between 75 000 000 t and 100 000 000 t.

At Intervale, reserves of 97% gypsum have been estimated at just less than 4 000 000 t.

PRODUCTION Historically, Canada Cement has produced approximately 200 000 t to 300 000 t of limestone annually, primarily for use in cement manufacturing. However, since the scale-down of its operations, stone quarried for cement production has been less than 60 000 t. Recently, production has included aggregate and some high-calcium stone sold to Havelock Processing Ltd.

Gypsum has been produced from Intervale as required (5 000 to 25 000 t/a).

DEVELOPMENT Grinding operations of stockpiled clinker brought in from the Nova Scotia plant continued on an intermittent basis through 1986. A new quarry 0.5 km east of the existing plant was opened during the past year.

EMPLOYEES 15-20 persons.

LIMESTONE[11]

Elmtree Resources Ltd. 21 P/13W

COMPANY Elmtree Resources Ltd., P. O. Box 665, Bathurst, New Brunswick E2A 3Z6. Telephone: (506) 546-6382. The Executive Officer and President is A. Buzas; the Manager and Vice-President is G. M. Doucet.

RIGHTS 245.9 ha Mining Licence No. 1360, under the Mining Act, Chapter M-14.1, S.N.B. 1985.

LOCATION The Elmtree quarry is located about 20 km north of Bathurst near the Village of Petit Rocher, Gloucester County (Figure 22).

HISTORY A quarry has existed on this site since 1880 and was operated on a 1814 t/a basis from 1930 to 1960 by Elmtree Co-op. Since 1960, it was operated on an intermittent basis until 1978 when it was acquired by Elmtree Resources Limited. Following extensive trenching and mapping, the quarry was expanded to include a crushing and screening plant, and a large storage facility.

PRESENT OWNERSHIP Elmtree Resources Ltd.

RESERVES AND GRADE Reserves appear to be adequate in the explored area for at least 10 years operation at current production levels. The cutoff grade is 50% CaO.

PRODUCTION Approximately 60 000 t of limestone was quarried and crushed, and was primarily sold to the smelter at Belledune as flux, although some is marketed as agricultural lime, construction stone and fertilizer filler.

DEVELOPMENT Continued operation.

EMPLOYEES 10 persons (average number).

Havelock Lime Works Ltd. and
Havelock Processing Ltd. 21 H/13W

COMPANY Havelock Lime Works Ltd. and Havelock Processing Ltd., P. O. Box 59, Havelock, New Brunswick E0E 1W0. Telephone: (506) 534-2311. The General Manager is L. Murray.

RIGHTS

50.9 ha Mining Licence No. 1129 (includes plant).
66.2 ha Mining Licence No. 1268 (undeveloped).
110.9 ha Mining Licence No. 1176 (undeveloped).
39.8 ha Mining Licence No. 1170 (operating quarry).
38.4 ha Mining Licence No. 1207 (operating quarry and processing facility).
97.1 ha Claim Block 260 (undeveloped).

All rights are under the Mining Act, Chapter M-14.1, S.N.B. 1985.

LOCATION The company operates a permanent quarry about 5 km west of Petitcodiac and a processing facility less than 1 km east of the Village of Havelock (Figure 22).

HISTORY Havelock Lime Works Ltd. has been quarrying in the area since 1939. The company was incorporated in 1964 and in 1970 a subsidiary company, Havelock Processing Ltd., was formed to manage the manufacturing of quick and hydrated lime. More recently, Dickenson Mines Ltd. acquired 60% interest in the Havelock group of companies in 1983. The company plans to acquire the balance of the operation in the next three years.

PRESENT OWNERSHIP Dickenson Mines Ltd.

RESERVES AND GRADE Less than 1 000 000 t of 95% $CaCO_3$ remain at Havelock's Samphill quarry following current extraction practices. However, this tonnage can be increased if a greater overburden-to-stone stripping ratio can be economically achieved.

PRODUCTION The company has traditionally produced about 250 000 t to 300 000 t of stone annually. Chemical process stone (for use as flux in nonferrous smelters, glass industry, pulp and paper mills and fibreglass), pulverized stone (for use in dusting mines and agricultural purposes), poultry grit, and crushed stone (for use as concrete aggregate and for general construction) are all listed products.

DEVELOPMENT Expansion plans are underway with the decision to construct a new kiln. A 300 t/a Fuller annular-shaft kiln installation is expected to be completed in 1987.

EMPLOYEES 34 persons (average number).

SILICA[11]

Chaleur Silica Limited 21 P/12E

COMPANY Chaleur Silica Limited, P. O. Box 4, Site 4, Petit Rocher, New Brunswick E0B 2E0. Telephone: (506) 783-2387. The Executive Officer, President and Manager is Jean Claude Godin.

RIGHTS Original King's Land Grant.

LOCATION The Bass River silica quarry is located approximately 6.5 km east of Bathurst, Gloucester County, south of Highway 11 (Figure 22).

HISTORY The property was originally explored by East Coast Smelting and Chemical Company in 1961, but the property remained undeveloped until 1974 when World Wide Explorations opened a small quarry. It was purchased by Godin M-E in 1976. The operation was expanded and modernized, and is now operated under the name Chaleur Silica Limited. A sandblast sand plant, with 77-91 t/d capacity of bagged sand, was installed in 1979.

In 1983, the company drilled five holes on a second property adjacent to the Nepisiguit River and intersected 10 m of silica similar to that already being quarried.

PRESENT OWNERSHIP The deposit is owned by A. Ronalds and G. Ronalds under an original King's Grant and mined under an agreement with Chaleur Silica Limited.

RESERVES AND GRADE Reserves are estimated to be in excess of 500 000 t of 95% SiO_2; however, most is inaccessible due to ownership problems.

PRODUCTION The quarry operates on a seasonal basis and has produced up to 60 000 t of silica annually. Markets are almost entirely dependent on the sale of silica flux to the smelter at Belledune; however, some blasting sand and nursery sand has been produced.

DEVELOPMENT Continued operation at a reduced level.

EMPLOYEES 14 persons (average number).

Sussex Silica Inc. 21 H/12E

COMPANY The Sussex silica deposit is jointly owned by Baskatong Quartz Ltd., P. O. Box 337, N.D.G., Montreal, Québec, H4A 3P6. Telephone: 514-482-6357; and Lockhart Exploration Ltd., P. O. Box 515, 328 King St., Fredericton, N.B., E3B 5A6. Telephone: 433-5890 (mine site). Mine Manager is Robin Turner.

RIGHTS Mining Lease 241 (599 ha) and 24 claims (387 ha) under the Mining Act, Chapter M-14.1; S.N.B. 1985.

LOCATION This deposit of unconsolidated silica sand is about 16 km southwest of Sussex, immediately northeast of Cassidy Lake (Figure 22).

HISTORY The deposit was discovered in 1982. After identifying sufficient reserves of high-quality sand, a pilot plant was set up in 1983 for product testing and marketing.

PRESENT OWNERSHIP Baskatong Quartz Ltd. of Québec and Lockhart Exploration Services Ltd. have interests in the property.

RESERVES AND GRADE Approximately 9 000 000 t proven reserves and more than 22 000 000 t possible reserves of silica sand containing greater than 98% SiO_2 are indicated.

PRODUCTION Production from this mine began in the fall of 1986, consisting of several thousand tonnes of lump silica and sand of various sizes. The lump silica was used in the manufacture of silicon metal and silicon carbide at Becancour, Québec. Existing capacity of the operation is estimated at 80 000 t/a.

DEVELOPMENT Plans to gradually expand into specialty marketable products including sand blasting material, filtration, tree nursery, decorative sands and sands used in the manufacture of glass and fiberglass.

EMPLOYEES - 7 person (Average number).

CLAY PRODUCTS[11]

L.E. Shaw Limited 21 I/4W

COMPANY L.E. Shaw Limited, Head Office: P. O. Box 2130, Lantz, Nova Scotia B0N 1R0. Plant and Quarry Office: P. O. Box 188, Chipman, New Brunswick E0E 1C0. Telephone: (506) 339-6605. The Manager is George Roberts.

RIGHTS The company owns about 40 ha of land. Quarriable substances are vested in the owner of the land in or on which they lie.

LOCATION The quarry is located about 3 km east of the plant in Chipman, New Brunswick (Figure 22).

HISTORY In 1929, the company opened a plant in the heart of the Minto coal field at Chipman to use waste shales from the coal mines in making brick and tile. Since 1935, raw material for the plant has been obtained from the shale quarry.

PRESENT OWNERSHIP L. E. Shaw Limited.

RESERVES AND GRADE The material is purple-red sandstone, shale and siltstone from the Hurley Creek Formation.

DEVELOPMENT The company continued to operate a brick plant using local red shale. The plant produces facing brick, drainage tile, partition tile, radial tile, interlocking tile, and flue liners. Quality acid-resistant brick can also be produced.

EMPLOYEES An average of 25 persons for both the quarry operation and manufacturing sector.

PROCESSED (DIMENSION) STONE[11]

Nelson Monuments Ltd. 21 H/12

COMPANY Nelson Monuments Ltd., P. O. Box 1220, Sussex, New Brunswick, E0E 1P0. Telephone: (506) 433-3413. Mr. Merrill Nelson is the President.

RIGHTS Quarriable substances are vested in the owner of the land in or on which they lie.

LOCATION The plant is located in Sussex, New Brunswick (Figure 22), but quarries have been operated in various places: Charlotte County and Hampstead, (N.B.) and Vermillion Bay (Ontario).

HISTORY The company was founded in 1909, and in 1959 it moved from Hopewell Cape to Sussex.

DEVELOPMENT The company continued to produce monuments, markers, curbing stone, and stone for landscaping use. Much of the granite sold in 1986 was imported from Ontario and South Africa.

EMPLOYEES 25 persons (average number) in Sussex; 3 elsewhere in New Brunswick.

Smith Cut Stone and Quarries Limited 21 I/2

COMPANY Smith Cut Stone and Quarries Limited, P. O. Box 69, Shediac, New Brunswick E0A 3G0. Telephone: (506) 532-6902. The President is Roy E. LeBlanc.

RIGHTS Quarriable substances are vested in the owner of the land in or on which they lie.

LOCATION Shediac, New Brunswick (Figure 22).

HISTORY Founded in 1818, this is the oldest stone quarrying company in New Brunswick. The Shediac sandstone quarry has provided building stone for numerous construction projects, including Moncton's Cathedral. For the last 25 years it has mainly provided cut stone for restoration.

DEVELOPMENT The company continued to operate a local sandstone quarry and was involved in restoration projects in Boston, New York, and Calgary.

EMPLOYEES 1 to 15 persons in 1986.

CRUSHED STONE[10]

Major operations producing crushed stone for use as aggregate are centred around the Fredericton and Moncton areas. Both of these areas are deficient in good quality, coarse, surficial, granular aggregate materials.

In the Fredericton area, Diamond Construction Limited maintains a crushing operation at Springhill, on the south side of the Saint John River. The material crushed is a Silurian greywacke. On the north side of the river, Forbes and Sloat Limited crushes Mississippian basalt at a quarry at Douglas, just west of Fredericton.

In the Moncton area, Moncton Crushed Stone Division of Modern Construction Ltd. crushes granitic rocks of Precambrian age at a quarry at Stilesville, northwest of the city. Manufactured fine concrete aggregate is also produced by the operation, by blending crusher-produced fine aggregate with washed natural sand trucked in from the Rogersville area. H.E. Carson Limited also operates a quarry in metasedimentary rocks in the Stilesville area. To the east of Moncton, at Gaytons, Precambrian granitic rocks are crushed by Acadia Crushed Stone Division of Modern Construction Ltd., and by MacDonald's Paving and Construction Limited.

Brookville Manufacturing Company Limited near Saint John, and Havelock Lime Works of Havelock, produce crushed dolomite and limestone, respectively, for use as aggregate, in addition to their other lime products. Elmtree Resources Limited of Bathurst also produced a limited amount of crushed limestone for use as aggregate.

Preliminary estimates of stone production for 1986 (Statistics Canada figures) are 2 030 000 t with a value of $11 074 000. In comparison, 1985 production was 2 394 090 t valued at $12 168 000.

SAND AND GRAVEL[10,13]

Most sand and gravel pits in New Brunswick are operated on an intermittent, on-demand basis; many of these can produce only low-specification aggregate. The comparatively few permanent operations are found where large deposits of good quality material lie within economical trucking distance of high-demand, urban areas (e.g., the Saint John area).

Preliminary estimates of sand and gravel production in New Brunswick during 1986 (Statistics Canada figures) are 8 200 000 t, with a value of $16 702 000. In comparison, production in 1985 was 9 177 000 t valued at $9 700 000.

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Appendix 1.
Metric Abbreviations and Conversion Factors

ABBREVIATIONS

cm - centimetre
m - metre
km - kilometre
g - gram
t - tonne
L - litre
ha - hectare
mgal - milligal
Hz - Hertz
M - mega (prefix for 1 000 000)
t/a - tonnes per year
t/d - tonnes per day

CONVERSION FACTORS

For precious metals:
ounces per ton (oz./ton) x 34.285 71 = grams per tonne (g/t)

Square miles (sq. mi.) x 2.589 988 = square kilometres (km^2)

Short tons x 0.907 184 = tonnes (t)

Acres (ac.) x 0.404 685 = hectares (ha)

For oil (1 barrel = 42 U.S. gallons):
barrels x 0.158 987 3 = cubic metres (m^3)

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